The Builder.

VOL. LXVIII. No. 2715. FEBRUARY 16, 1895.

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The Ancient Cambodian or Khmer Monuments in Eastern Siam.

IN the region bordering on the great lake Talé Sap (sea of fresh water), which forms the part of Cambodia under Siamese dominion, there exist many magnificent ruins, some of religious, some of civil character. Of these many are well preserved, others are more injured by the centuries that have passed over them. The two sketch-maps show, one, the relative position of these monuments, the other, the position of this group of ruins in the Indo-Chinese Peninsula. The position of this group is between lat. 13 deg. and 14 deg. N., and long. 103 deg. and 104 deg E. They are known as the ruins of the province of Angkor, and are situated in the modern Siamese province of Siemrap. Monuments of the same origin and characters are to be found in other places on the south and the east of Angkor, in proximity to the banks of some branches of the Mekong river.

The Khmer people are supposed to have arrived in the southern part of Indo-China, in the year 443 B.C.; their chief having been an Indian prince named Phratong, who was banished from Delhi by a usurper, and emigrated with great numbers of his countrymen (the annals say many millions). He found in the country a savage nation, mentioned by the name of Nagas, probably as worshippers of the serpent of this name, and the Chous; which nation, coming from the north, had invaded the country one century before. He is said to have made an alliance by marriage with the daughter of the chief of the Nagas, and to have defeated the Chous. Thus began the empire of the Khmers in Kamputcha, or as we call it Cambodia, pre-eminent in ancient time amongst the great states of Indo-China, which greatness is so impressed still, by tradition, in the mind of the natives, that they assert that it had twenty tributary kings, an army of five millions of soldiers, and that the buildings of the Royal Treasury alone covered an area of some miles. When Phratong settled in the country, he founded the city of Angkor Thom, which became his capital and that of his successors. Under his reign the Khmers started the erection of some monuments, but the most important ones were not completed before the year 250 B.C.

All agree to attribute to the Khmers the construction of all these ancient monuments; the annals of Cambodia, the tradition, the interpretation of various inscriptions, all repeat the same tale, with the addition, however, that Angkor Thom was completed shortly after 443 B.C. (one century after the death of Sakyamuni, the Buddha), that is to say, a few years after the immigration of the Khmers. But the monuments at Angkor Thom and the surrounding places required certainly a long succession of years for their execution; and it has been suggested that some of them are due to the expelled race of the Chous. The latter, however, entered the country only a century before the Khmers, and must have had too much trouble in settling themselves in the country to be in a condition to give attention to works of art, and their degree of civilisation was not so high then as to enable them to conceive and to execute such monuments. The Chous, who were Brahmins, did certainly some good work of the kind, as is proved by some ruins in Vienchang and other places, but probably it was in imitation of the Khmers.*

In conclusion, it may be taken as matter of fact that the Khmers, at their immigration into Cambodia, did not find any stone monuments, or at least any monuments of any importance, and that the stone monuments of Cambodia are due to the ancient Khmers, to the exclusion of any other nation. The better conceived and better constructed were erected by them between the second century before and the third century A.D. The more recent and less important ones date from the first to the tenth century A.D. From this time a rapid decline, due partly to the influence of Buddhism, is noticeable in the brick pyramids and other brick works, which are inferior in merit to the ancient stone constructions. It would seem that the ancient religious monuments were in their origin dedicated to Brahminism. In fact, at the arrival of the Khmers, the reform of Buddha dated little more than a century back.

There is no mention in the annals of the religion of the Khmers at this time, but it is known that they spoke Sanscrit, which was usually the language of the Brahmins. On the other hand, the annals of Cambodia and those of Siam say that Buddhism was established there very early; other traditions say by Buddha himself, the date of this fact being stated as 542 B.C. But it must be remembered that the reform of Buddha suppressed by degrees only the old Brahminic faith, and, probably, in the temples statues of Buddha were erected when the gods of the Brahmins were still worshipped. Thus, an inscription at one temple, that of Wat Eck, mentions Vishnu and Buddha.

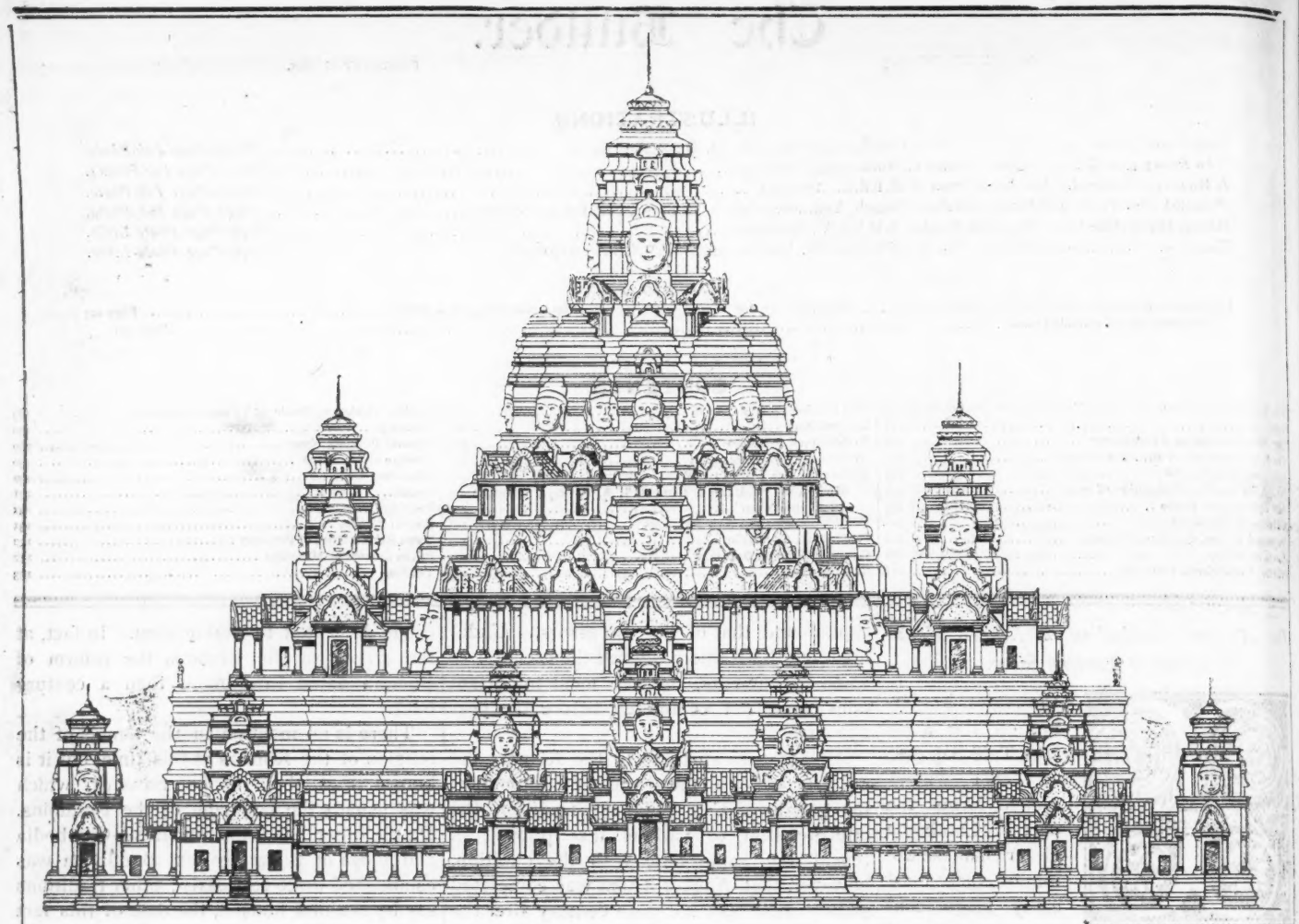
The recorded facts speak in favour of a Brahminic origin, but the more eloquent ones are the disposition and ornaments of the stone temples, the bas-reliefs representing heroes of the sacred poems of India, and the statues of gods of the Brahminic pantheon. In conclusion, it appears that they were specially dedicated to Vishnu and Siva, and that the statues and emblems of Buddha were introduced afterwards.

The principal material used in the construction of the ancient monuments is stone of a grey colour, and another of a slightly pink colour. Both are easy to cut in the quarries, and become hard after exposure; the alternate action of wet and dry, however, in course of time, injures them. Their grain is fine, and they can be well polished. Good quarries are to be seen some fifteen miles east of Angkor Thom, where the traces of the old works are visible. Probably there are many other quarries in proximity to the various edifices, now hidden by the vegetation. The freestone was used in the construction of temples, palaces, towers, &c., and was cut in regular-shaped blocks of various dimensions, often measuring 6 ft. by 3 ft. by 4 ft., sometimes much more. No cements were used.

The stone from Bienhoa, an iron concretion, was used for rough walls, roads, &c. The more yellow and that presenting a rougher grain was preferred. It is very abundant all along the valley of the Mekong River. It varies in its mode of conglomeration and colour.

Bricks were not used in the construction

* The writer knows of an ancient sanctuary, half-ruined, which lies in the midst of jungles in a district inhabited by Chous, in Siam proper, and erected by them. It is placed about 40 miles east of the Bang Pak Kong River, about 13 deg. N. lat. This sanctuary has all the Brahminic characteristics of the Khmers' temples, and contains a statue of Vishnu. A Sanscrit inscription, which may throw some more light upon the history of the country, is still well enough preserved, but circumtances prevented a copy of it being taken.


ELEVATION AB
10 5 0 10 20 30 40 50 60 70 80 90 feet SCALE OF THE ELEVATION
40 30 0 40 80 120 160 200 240 280 320 360 " " " PLAN
III LEVEL OF THE GALLERIES AND YARDS OF THE 1st FLOOR
II " " " " " 2nd "
I " " " " " 3rd "
A PRINCIPAL SANCTUARY
POSITION OF THE TOWERS

Bang Yong, inside the City of Angkor Thom.

of great monuments in the districts where stone-quarries are in existence. They were used at a later period in these places, and sanctuaries of secondary importance occur constructed with bricks. But in other parts of Cambodia, where stone-quarries are not to be found, there are some important brick buildings, perhaps contemporaneous with the stone ones. The bricks are of about 1 ft. by 8 in. by 3 in. The Khmers, although they made very good bricks, did not use tiles in the roofs of their stone monuments. They used to cut the exterior of the stones so as to give the appearance of enormous curved tiles. Wood was used only for doors and windows.

The span of the vaults is never more than about 12 ft. or 14 ft. wide. The columns supporting the vaults are of a square shape, though round columns are used as ornaments only. The passages are high over the ground, the sides are covered and supported by stones of Bienhoa or by freestone, showing horizontal mouldings. The plans of the temples have in general a rectangular shape, one side a little longer than the other. The principal axis is placed in the direction from east to west, and the principal façade and doorway on the east. Angkor Wat is an exception to the last rule, having its principal front towards the west.

The combined plan of the terraces, sanctuaries, porticoes, forms sometimes a Latin, sometimes a Greek cross. Both here and in the west these shapes are probably taken from the Brahmans. The towers have various shapes, but in general the base is square, and the shape is modified in successive stories till it becomes circular at the top. In elevation the upper part presents often an oval shape, or that of the bud of a lotus, the sacred flower.

The principal definitions in relation to Khmer architecture may be given as follows:

The *Phrasat*, known as *stupa* by the Indians, is a sanctuary covered by towers. It contains a small vaulted room and an altar in it, under which were often buried kings or princes, or other persons of high rank. Vases of gold and silver, containing ashes, have been found in these apartments.

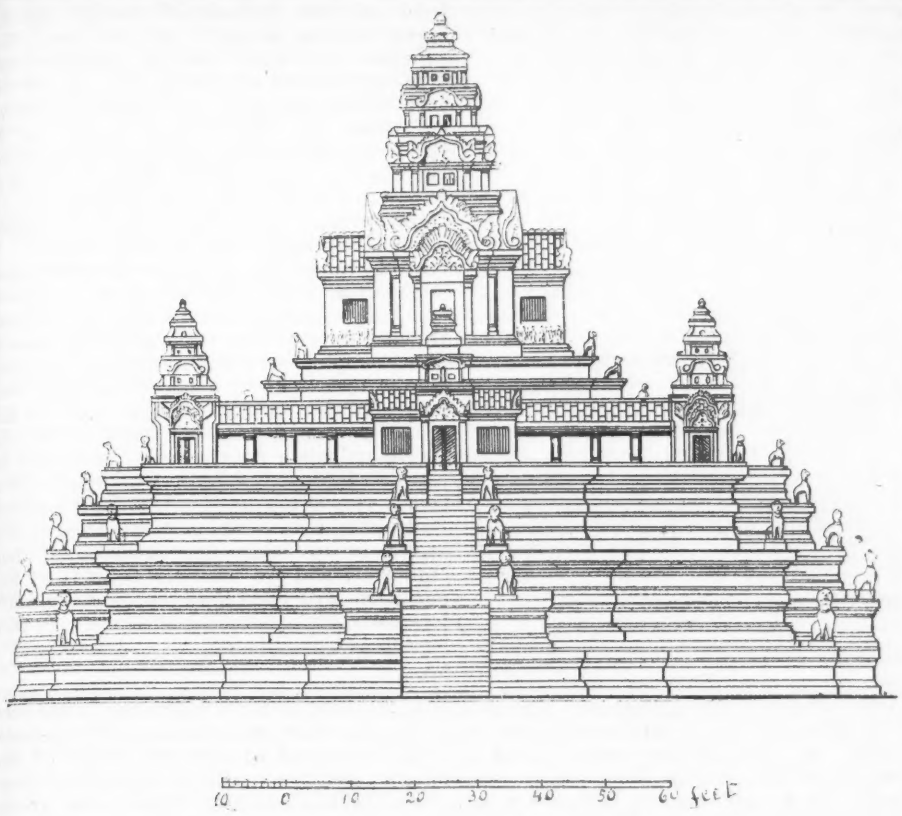
The *Chdays* are specially funereal monuments.

The pyramids are monuments consecrated to Buddha in memory of some conspicuous occasion, and ought to contain relics.

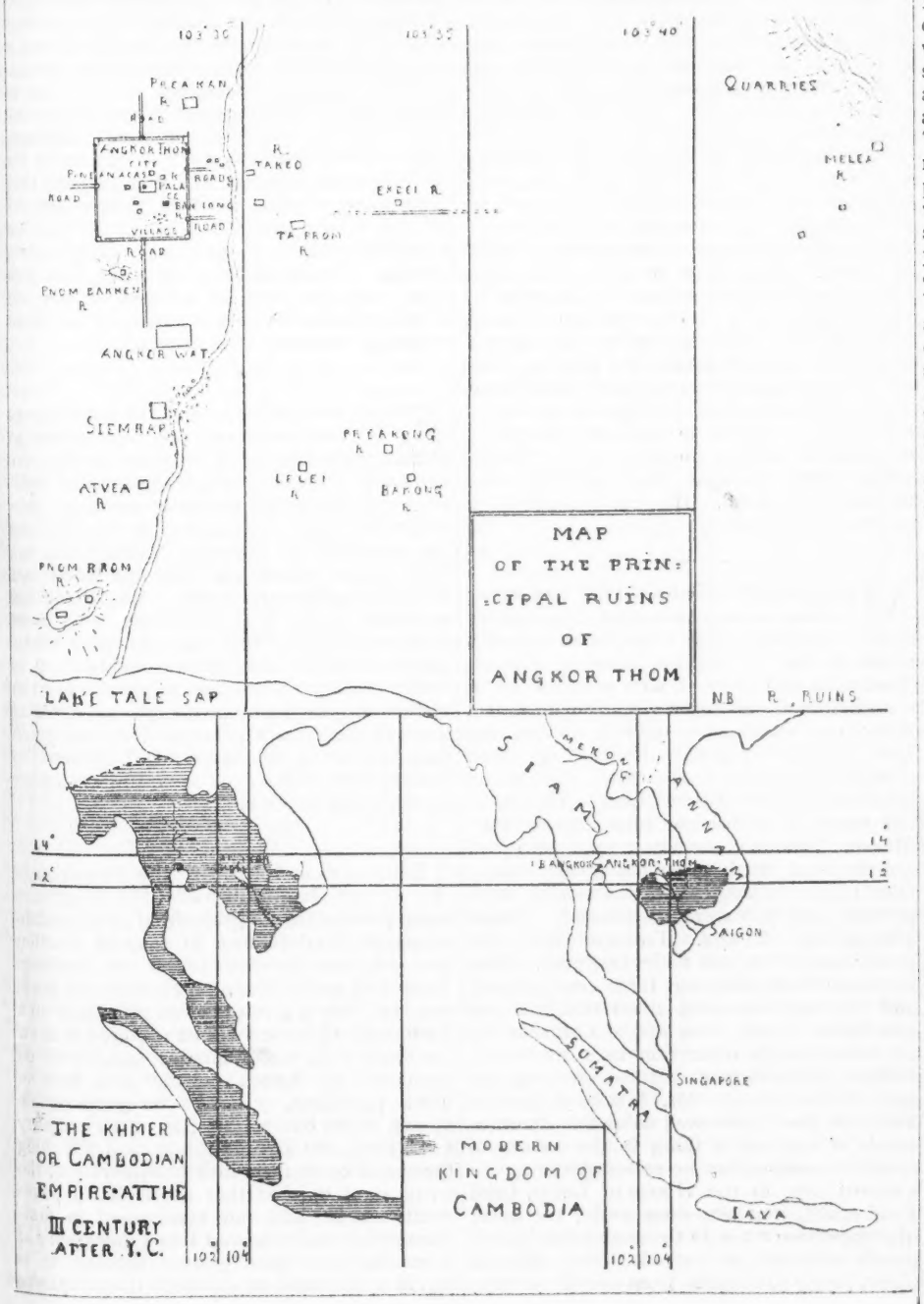
The *Sras*, of pure Brahminic origin, are sacred water reservoirs, and many are to be found in all the ancient temples. The *Cuheas* are sacred grottoes.

On the grounds surrounding a temple, at the doors of the sanctuaries, &c., there are to be found statues of lions of different sizes, and of the demi-god Ganesa. The Khmer lion is very muscular, and has no mane. Ganesa, son of Siva and Parvaty, is represented with the body of a stout man, with the ears, trunk, and tusks of an elephant. He is covered with a three-storied tiara with a globe on the top.

A many-headed serpent appears often in the ornaments of temples and other monuments; sometimes as a seat for a god, sometimes as the symbol of eternity with its tail in its mouth, often with seven heads, sometimes with more. The serpent appears often as a stone balustrade in terraces, roads,



Dinean Acas, inside the City of Angkor Thom.



bridges, &c., and is supported by cubic blocks of stone, or by statues of giants. Its heads are erected with a threatening expression.*

The three-headed elephant is another interesting ornament. In the illustration of the restored city gate of Angkor Thom, the triple elephant is to be seen at each side, acting as a kind of caryatid. The ape is also frequently represented in carvings on the temples; sometimes a battle of apes and men.

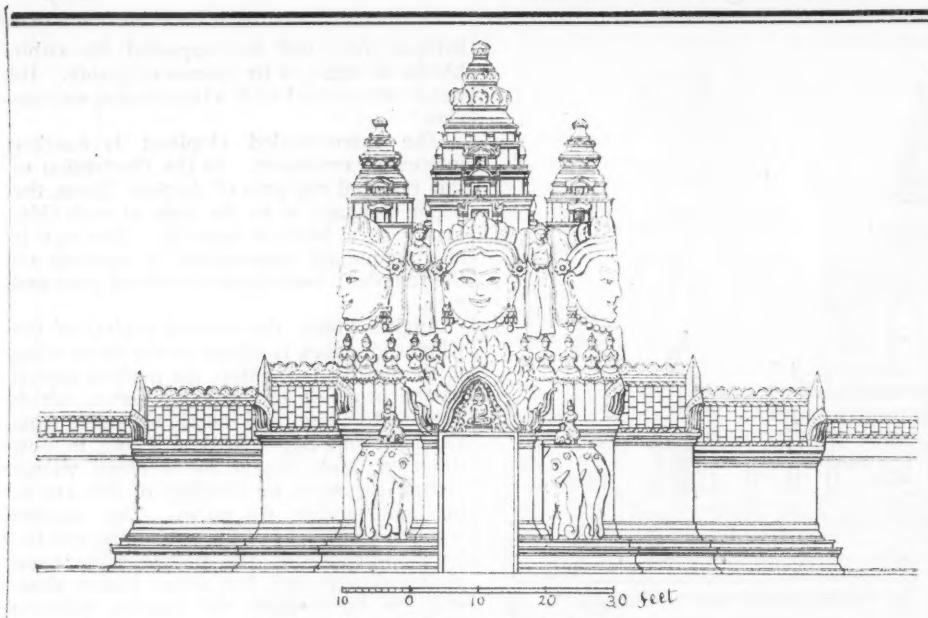
Angkor Thom, the ancient capital of the Khmer kingdom, is placed nearly three miles to the north of Siemrap, the modern capital of the province of the same name, which belongs to Siam, and nearly six miles from the lake Talé Sap. Angkor Thom is now deserted, and, except for a small village among the ruins, no vestiges of life are to be found inside its walls. The ancient wooden residences of the noblemen, and the bamboo-houses of the people, have completely disappeared, but some stones show still the holes where the wooden columns were fixed. A small river flowing into the lake passed close to its walls, but the town by its position was not exposed to the periodical inundations of the lake. The rectangular walls as well as some of the gates of the city are still well enough preserved. The sides running from east to west are a little longer than the others. The city is supposed to have been fortified, but bastions and other works of this kind are not to be seen. The walls are about 20 ft. high and 12 ft. wide on the top, and sustain inside an earthwork 15 ft. high and 50 ft. broad on top. Many square conduits of good masonry crossed these works, and discharged the waters from the town into a canal, which surrounds the walls on all their length and is about 360 ft. wide. The walls have a circumference of about seven miles. They are constructed with iron conglomorate (Bienhoa stone) and in the upper part crowned with freestone. The canal, which is full of water during the rainy season and is never dry through the whole year, contains many alligators. Five roads come out from the town through five gates. The bridges crossing the canal and the roads are about 50 ft. wide. They have an enormous balustrade on both sides, consisting of a colossal seven-headed stone serpent supported by stone giants, some of them many-headed. Each balustrade has fifty-four giants, making for five roads a total of 540 colossal statues sculptured with astonishing skill, though in a savage and barbarous style of grotesque exaggeration.

The gates of the city offer a passage about 12 ft. wide. Their crowning towers are supported on a square base. Each tower represents four heads of Brahma. Their exterior walls are covered with ornament, the interior is plain. The base represents two three-headed elephants, These magnificent gates are all constructed with the finest freestone. The eastern wall has two gates, one called the gate of Victory, the other the gate of Death, probably because from it the dead were carried out. The other walls have one gate each. At the four corners inside the town there are the ruins of two circular buildings used as stores for material of war.

The ruins of the interior of the city still enable the visitor to appreciate in full the merit of its monuments. The more important of these are Bang Yong ("fine view"), Pinean Acas ("high place"), and Ba Puon. They were probably religious as well as civil monuments, as is often the case in this country, where people go to their temples for religious purposes as well as for meeting friends, and wandering about the buildings and gardens of the Wat.

Bang Yong is essentially composed of rectangular galleries containing in the centre a high and broad terrace from

* Casts of some of these serpent railings are to be seen a Paris, either at the Louvre or in the Trocadéro sculptur museum; they have been moved about a good deal.



City Gate of Angkor Thom.

which a fine view can be enjoyed. This terrace is surrounded by numerous towers of various dimensions, all profusely sculptured. The central one is really a marvellous work of art. Its height is about 180 ft. from the yards of the lowest gallery. This monument is perhaps one of the best erected by the Khmer. It is known also as the monument of the fifty-one towers. At the foot of the central tower there is placed a sra, or water-reservoir, which is an indication that an idol had once been there, of which all traces have disappeared. It seems probable that in this monument were buried the ashes of the kings. Pinean Acas is formed by three terraces superposed. On the higher there is erected a large tower surrounded by a small vaulted gallery from which a fine view of the town and neighbouring country is obtained.

Four flights of stairs, one on each side of this pyramid, lead to the terrace. It was probably a civil monument, judging from the absence of religious symbols, and the inferior material employed in its construction. Only the high gallery and the tower are constructed with fine and regular blocks of free-stone. This monument is placed inside the walls of the royal residence. Ba Puon has also the shape of a pyramid on a rectangular base. It is formed of seven superposed terraces, on the highest of which is erected a sanctuary, covered by an enormous tower.

The completion of the principal monuments lying inside the walls of Angkor Thom dates, in all probability, from the third century, B.C. The most important of the ruins, outside the walls of the city, is the temple of Angkor Wat, which was commenced in the second half of the first century B.C., and is considered as the best production of the Khmer architecture. Of this we may have more to say.

NOTES.

THE works in sculpture left by the late Thomas Nelson Maclean have lately been on view for private sale at his studio in Bruton-street, and are a reminder of his comparatively early death last November, after only eight months of married life. The son of an engineer, he was born in 1846 at Deptford. He first studied drawing under Mr. Sparkes, at the Lambeth School, and it was while there that, exhibiting a great taste for sculpture, his father, who wanted him to follow his own profession, at last gave his consent that Maclean should study at Paris. He worked there in various sculptors' studios, and was in Paris during the siege. On his return to London he produced several small terra-cottas, his first great success being his "Ione," exhibited at the Royal Academy in 1879. Afterwards he spent three winters in Florence, executing his "Ione" and his "Spring Festival" in marble. This latter, to which we have before referred, is, it will be remembered, a translation into marble, life-size, of two figures in a well-known picture by Mr. Alma Tadema. Latterly, Mr. Maclean had been engaged on two large figures for India, viz., the bronze statue of Sir Arthur Phayre for Rangoon, the marble statue of Kristo das Pal for Calcutta. At the time of his death, he had just completed an ideal life-size figure of "Sappho," a remarkably successful attempt at strong expression in sculpture. Arrangements had been made before his death for casting the statue in bronze. His method was interesting, in that he generally executed a highly-finished model to a small scale, which was subsequently enlarged by the scale-pointer; much greater interest therefore attaches to the small models than to the sculpture. In place of a vapid classicalism he preferred to give realistic character to his ideal figures, and in consequence some of these may be criticised as possessing the defects of average humanity; gaining, however, the interest attaching to semi-portraiture. The most classical of his figures is that of "Tragedy," while in general sculptural excellence nothing equals the "Ione," which first brought the sculptor into notice in England. His early death is a loss to English art.

MR. JUSTICE KEKEWICH has struck a somewhat severe blow at aggressive trades unionism. The case arose out of a recent strike among the men in Messrs. Trollope's employment, with which some of our readers are no doubt already acquainted. After the conclusion of this strike, the London Building Trades Federation issued a large poster with a mourning border, and headed "Trollope's Black List." This gave the names of non-union men employed by Messrs. Trollope, including men who had remained at work after the strike began. One thousand copies of this poster were printed, and 750 were distributed. It was alleged by Messrs. Trollope that the poster would injure their business, deter workmen from entering their employment, and the workmen complained that it would also injure them. The application was for an interlocutory injunction to restrain the further publication of this list pending the trial of the action. Mr. Justice Kekewich held that the poster was unlawful—in other words, it was not a thing in the nature of *bonâ-fide* competition or self-protection. In a recent case in the House of Lords, Lord Field said that if acts done under the guise of competition "are in themselves violent or purely malicious, or have for their ultimate object injury to another from ill-will to him, and not the pursuit of lawful rights," they can be stopped by the law. Mr. Justice Kekewich was of opinion that the publication of the poster fell within the above principle. The principal motive of those who issued this poster was to injure those workmen who were mentioned in the black list, and also Messrs. Trollope, "and to prevent them from carrying on their ordinary trade or business with that freedom which was the privilege of Englishmen." It is to be hoped that this decision will be taken to heart by trade unionists all over England. No body of men are louder in their protestations and complaints at the smallest pressure from employers and capitalists; but they forget that there is a homely proverb, that what is sauce for the goose is sauce for the gander. The freedom of action which the trade unionists rightly claim must also be accorded to non-unionist workmen and the employers of labour. Trade unionists are not entitled to hinder non-unionists from getting work, or to injure them because of their opinions, and we have no doubt that this decision will open the eyes of many workmen who are inclined to tyrannise over their fellows.

THE frost of the last few weeks has been the cause of numerous kitchen-boiler explosions and of lamentable loss of life. From Dunston, near Gateshead-on-Tyne, Morecambe, Fleaton, and many other places comes news of such accidents, which have inflicted death or serious injuries on men, women, and children, besides causing great damage to property. The inquest on the two deaths at Morecambe elicited the facts that the boiler was of cast-iron, and had not a safety-valve fitted to it. Such boilers as this (and their number is legion) are in time of frost simply death-traps, and it is certainly high time that their use was prohibited. A safety-valve can be fitted to an ordinary boiler for less than ten shillings, and it is a shame that persons responsible for the erection of houses should submit the occupiers to such hideous risks for the sake of saving so paltry a sum as this. Yet it has been estimated that less than one per cent. of kitchen boilers are fitted with safety-valves, in spite of these annually recurring fatal events.

FROM particulars received of the progress of the work on the new docks at Portsmouth Dockyard, it appears that the contractors are experiencing unusual difficulties from water, which is no more than might be expected considering the site and the nature of the ground. A coffer-dam has been made which has been extended and strengthened several times. A new leak has occurred under it, and efforts have been made to stop this with bags of sand whilst the foundations have been cemented. It is said to be almost hopeless to try to keep the water out, judging by past experience, for as soon as the leaks are stopped in one place they appear in another, and altogether the constructors of the dock seem to have rather troublesome times in store.

IN the current volume of the Proceedings of the Institution of Civil Engineers some particulars are given from an American source of the difference in ease of traction between various descriptions of roadway. According to Mr. Rudolph Hering, if a horse can just draw a given load on rails laid on a level road, $1\frac{2}{3}$ horses will be required to draw the same load under similar conditions on asphalte, $3\frac{1}{3}$ horses on the best Belgian block pavement, 7 horses on good cobble stones, 13 on bad cobbles, 20 on an ordinary earth road, and 40 on a sandy road. Taking these and other facts into consideration, the writer is of opinion that an asphalte pavement can be laid and maintained in first-class order, and renewed when necessary at a smaller cost than granite blocks. It is stated to be well established that asphalte

costs 20 per cent. less than granite or ordinary wood to keep clean, and the greater cleanliness thus insured is a sanitary gain. Asphalte is also impermeable and non-absorptive, is noiseless, and is not subject to organic decay. The lesser wear and tear on vehicles as compared to rougher pavements has also to be considered.

SOME modified rules as to Organised Science Schools have been issued by the Department of Science and Art, and will take the place of the existing paragraphs 22 to 28 in the "Science and Art Directory." The most important feature in the new rules is the introduction of payment on inspection instead of payment by "results." We presume that "results" has a special official meaning in the vocabulary of the Department, as in the ordinary sense of the word the payments are still by results, consisting of a variable grant of 2*l.*, 1*l.* 10s., or 1*l.* per student, according as the student is reported "excellent," "good," or "fair." The real difference seems to be that the report will depend on the personal visit and examination of an Inspector. An "Organised Science School" is one in which the instruction is carried on methodically according to one or other of the courses laid down in the new rules. Other modifications of existing rules are to the effect that provision is made for a certain amount of literary instruction being given whilst the student is pursuing his Science curriculum; that greater freedom is given to the teacher as to the syllabus he is to teach in the first two years of a student's course; that a choice of advanced courses is given, and an alternative programme suitable for women formulated, and instruction in subjects specially adapted to them is demanded; and that practical instruction must be given in the subjects taken, simultaneously with the theoretical instruction.

THE decision of Mr. Justice Kekewich in the recent case of Farmer *v.* The City and Waterloo Railway Company is of great importance to the public in view of the promised legislation by Parliament for facilitating the construction of light railways. In recent years Acts have been obtained by electric railways authorising them to "appropriate and use" the subsoil under private property without purchasing the surface or any buildings thereon. The Act of the Waterloo and City Railway Company left the question open as to whether the land was to be appropriated with or without payment. It seems now settled authoritatively that the "appropriation" can only be made by purchase, even when the boring is at a great depth, and the soil quite valueless and inaccessible. An injunction has been granted against the company, and the question of the price to be paid will probably be settled by arbitration. Without an Act of Parliament no one can take from an unwilling landowner any of his subsoil, or can obstruct his view of the sky overhead, for as the judge stated, it is a legal maxim that the ground is the landowner's from the centre of the earth to the heaven. Hence he might refuse to part with the subsoil unless the company purchased also the land vertically overhead and the buildings on it. Railway companies have had to do this in many cases. As we have said, recent legislation has been in the direction of modifying this maxim, and the promised legislation in connexion with the construction of light railways will probably modify it still more. For any actual injury or annoyance, landowners will probably always be able to claim compensation, but as to whether owners of a valueless and to them inaccessible subsoil in agricultural districts could have their rights over it curtailed without injustice, seems a question well worth the consideration of Parliament.

THE severe weather has afforded one of the London water companies a brilliant opportunity of showing the public how fully capable a water company can be of indifference to the difficulties of the householder in maintaining a supply of water under very trying circumstances. It is the practice of many tenants of middle-class houses in which the water-supply arrangements are rather defective, to leave the tap slightly running in order to prevent the water, as far as possible, from freezing in the pipes and thus cutting off the supply. The West Middlesex Company served a notice the other day on householders in West Kensington Park (amongst other places), which notice was in the nature of a threat, and reminded them that to leave taps running led to great waste of water, whilst it was illegal. The notice also stated, in effect, that great pains and penalties would devolve on anyone detected in such malpractices. The inhabitants of the district in question were not so easily frightened, however, if we may judge from the subsequent action of the water company. In the dead of the following night, or the next, the company shut out the water for a few hours from certain portions if not from all the district. This was a very cowardly act, for of course it stopped the circulation, promoted freezing in pipes, and thus effectively cut off the water from many houses for the past week or two. We are informed that the houses referred to come under the constant service system, which only aggravates the case. No one could object to the prosecution of habitual water-wasters, or where, through sheer negligence, taps are allowed to run for months together; but surely it is not too much to expect a little indulgence during such seasons as the present. No Corporation under public control would dare to behave in such a fashion. In a few years' time the public will be able to control circumstances of this kind, and the sooner the better.

THE set of pictures by Sir E. Burne-Jones illustrating the legend of St. George and the Dragon, which are on view at Mr. McLean's Gallery in the Haymarket, were, we gather, painted many years ago, though only now first exhibited. They are very unequal in conception, and in some respects in execution. In regard to the first, "The King's Daughter," it is really almost absurd to print lines implying a beauty almost beyond description—outbidding that of the famous three on Mount Ida—and to illustrate them by a figure of a thin, lank damsel, with no special beauty of either expression or physique; and the three succeeding pictures seem to us to fall almost as much below the suggestion of the legend. The fifth, the princess tied to the tree, has much more of the sentiment of beauty; and in the fight with the dragon the painter has achieved a fine St. George and an original and sufficiently loathly dragon; though here again the picture is rather spoiled by the affected attitude of the watching princess. This study of the knight and the dragon appeared on a smaller scale, in water-colour, at an exhibition of the Society of Painters in Watercolours; the dragon was then treated in much darker tones, and, as we observed at the time, looked rather like a colossal cockroach; the present study is what would be called, in the slang of the modern newspaper critic, more "convincing." The last picture of the series, the princess and her deliverer returning with a procession of joyful maidens, is quite the best of the set. The princess has in this more pretentions to exceptional beauty; the movement of the various figures is animated, and the effect of colour rich and effective, though it is perhaps rather too conventional an expedient to make the knight's red cloak blow back from his shoulders (to form a background for the princess's head), when there is no other sign of wind in the picture. But painters will do these things.

THE exhibition of dry-point etchings by M. Helleu, to be seen in Mr. Dunthorne's miniature gallery in Vigo-street, should not be overlooked by those who enjoy the study of æsthetic rarities in artistic conception and workmanship. A few of M. Helleu's heads and other studies have been seen in London for two or three years past at the exhibitions of the Society of Painter-Etchers; but at Vigo-street there are nearly sixty of them collected, and they are nearly all worth looking at. M. Helleu's certainty and freedom in the use of dry-point etching, his power of modelling and foreshortening a face by line only, are in themselves remarkable; but there is a poetic interest in them beyond that of mere cleverness of execution. M. Edmond de Goncourt, in a brief but charming preface to the catalogue, describes Helleu's art as being "une sorte de monographie de la Femme dans toutes les attitudes infinies de son chez soi"; or as he sums it up at the close, "les *instantanés* de la grâce de la Femme"; expressions which very aptly describe the nature of the interest attaching to these etchings. None of them are highly finished, sometimes we have only a head and just an indication of the rest of the figure; but in all there is character, expression, a happy movement or pose seized on the instant, a beautiful face commemorated. Look at the grace, the character, and the easy naturalness of the sketch of "Femme au Chapeau Couchée" (9); the remarkable vivacity of expression conveyed in a few lines in the head of the "Jeune Fille Assise" (16); the "Profil de Femme au Chapeau" (25); the expression of thought and study in "La Sonate" (29), the beautiful heads of children, especially No. 34; the bold free sketch of a girl's head in No. 38; the piquant humour of "La Salutation" (47) where a merry girl shakes the paw of a dog. M. Helleu seems rather fond of exhibiting sometimes his mastery over difficult positions, as in the "Femme Enfilant une Aiguille" (54), where the face is in shadow and foreshortened, and the "Femme à la Tasse" (10) where the face is half hidden by the cup. But in general the object of these masterly etchings is beauty—the beauty of evanescent moments of pose and expression, seized on the spot and perpetuated in these delightful line memoranda.

THE *Daily Chronicle* has launched out with considerable success into the new movement for producing block illustrations in daily papers. The large block in its issue of Monday last, a representation of "Labour," from a drawing apparently made for the purpose by Sir E. Burne-Jones, was a great success, being drawn in the large and bold manner which has the best chance of printing well under the circumstances in which a daily newspaper is necessarily printed, and it is the best thing we have seen produced as a daily paper illustration.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

BY these lectures I not only hope to stimulate your industry, intelligence, and enthusiasm, but to give you some practical hints of the studies it may be useful to pursue, to put vitality into architecture and to improve it. The æsthetic part of architecture is by far the most difficult to treat, as it is of the vague rather than of the clear and definite order of things, and there has been little written on the subject that is of value. In dealing with materials, for example, you can measure and weigh them; you can by experiment find their strength in compression, tension, and cross strain; you can see how much water they will absorb in a given time; and how much they will lose by a given heat in a given time. If a great number of experiments have been made, and if you have experience, you can tell, if you use the greatest care in their selection, what to allow for variation in the quality of the materials, and for bad workmanship; and if the materials are not new you can see what deterioration takes place through time

* Being the third Royal Academy Lecture on Architecture this Session. Delivered on Monday evening, February 4, 1895.

and exposure, and then, if your statical calculations are right, you can be certain that your building will stand provided there are no exceptional tempests or an earthquake. By tabulating the experiments on wrought-iron and steel, and by a judicious application of the laws of statics, the great suspension, tubular, and girder bridges, as well as those gossamer-like structures, such as the Crystal Palace, have been built, and have not only stood, but have been the wonder of mankind. But to make structures, or parts of structures, that answer all the former purposes and move or delight the beholders as well is in quite another category. In one case you have definite and calculable forces to resist, in the other you have to touch the unknown springs of certain emotions. You can only judge what is likely to please by what has pleased, and you have to find out, if possible, not only why they have pleased, but what are the underlying principles that have made them please. If we could discover these principles then æsthetics would be a science that everyone could learn; at present it is an art that only exceptionally gifted persons can acquire by study and instinct. In dramatic literature two of the highest aims are to make the reader cry or laugh. Horace says if you want your hearers to cry you must first cry yourself; but though many treatises have been written on the cause of tears or laughter, the manner of producing these emotions has not been reduced to a science. Now those writers who make you cry or laugh are considered to be geniuses; when this art becomes a science, the producing tears or laughter will be looked on in the same light as shoeing a horse or mending a kettle. Swift in his "Letters to a Young Clergyman" says:—"I cannot forbear warning you, in the most earnest manner, against endeavouring at wit in your sermons, because, by the strictest computation, it is very near a million to one that you have none." Perhaps that would be good advice to all who consciously seek for what is called originality, which is mostly attained by exaggeration, disproportion, and oddness of arrangement; real originality only comes from original minds, and will, in that case, show itself properly and naturally, just as wit shows itself spontaneously in the witty; for surely those original architects, who have only been able to raise in us emotions of contempt or disgust, would have been judicious had they abstained from the attempt. I think that most architectural students, if they will only study the best buildings, will make their plans to accurately answer the purposes wanted, including the efficient lighting of the rooms, will study the Vitruvian symmetry until their eye revolts from disproportion, will try and make their profiles tell the story they want told, and will try and bring such parts that, from the exigencies of the case, obtrude themselves in odd places into harmony with the whole, that they will produce an effect which will raise their buildings to the dignity of humanity, and out of the range of the dog-kennel and rabbit-hutch type, and will not exhibit ugliness, disproportion, or vulgarity. We see plenty of examples where the designs have sunk much below this level; no building of dead walls, with holes in it for doors and windows, could cause us such disgust. Let me here say, by way of a parenthesis, that if you candidly consider that your design is more offensive than a dead wall, do not waste money and materials in making the wall more repulsive, but let it alone.

I propose to attack the problem of symmetry historically—at least from Greek times. The first treatise on architecture, that has yet been discovered, is that of Vitruvius, though we know from him that several Greek architects had written treatises, some on architecture generally, and some on the particular monuments that they designed. We must suppose that from the earliest civilised times, certain ratios of length to breadth, and of openings to solids in the outside of buildings, had been more admired than others; and that when the insides of buildings were light enough to see in, certain proportions of length to breadth and height had been found to be more agreeable to the eye than other ratios; that long before Greek times some rules of agreeable proportions had been deduced. In Vitruvius we see that rules for the relative proportions of buildings and their parts was a part of architectural teaching: and had been applied to all large objects as well, for he tells us that in ships the distance between the tholes was taken as the module. (Vit., lib. 1, cap. 2, p. 4.*)

* I use the Leipsic edition of 1867 by Rose and Müller-Strübing, with which a concordance by Nohl, 1876, is bound up, and which is in the Library of the Royal Institute of British Architects.

Vitruvius's directions for finding the module in Doric temples is as follows:—"The part of a Doric temple where the columns are placed must be divided, if tetrastyle, into twenty-seven parts, if hexastyle, into forty-two; of these, one part will be a module. . . . The distribution of the whole work is effected by the nature and regulation of this module, the thickness of the columns is two modules, the height, including the capital, is fourteen, the depth of the capital is one module, its width two and one-sixth modules, the thickness of the capitals is divided into three parts, of which one is the plinth and its cymatium, another the echinus with its annulets, and the third the hypotrachelion or necking. (Vit., lib. 4, cap. 3, pp. 3 and 4.)

For eustyle temples he gives another recipe for getting the module. He says:—"The front of the temple, if tetrastyle, is to be divided into eleven and a-half parts, exclusive of the projections of the bases and plinths; if hexastyle, into eighteen parts; if octastyle, into twenty-four and and a-half; and from these parts, whether tetrastyle, hexastyle, or octastyle, one part being taken will be the module." (Vit., lib. 3, cap. 3, p. 7.)

Vitruvius also says:—"The design of temples depends on symmetry, the rules of which architects should be most careful to observe. Symmetry arises from proportion. . . . . Proportion is a due adjustment of the size of the different parts to each other and to the whole; on this proper adjustment symmetry depends. Hence, no building can be said to be well designed which wants symmetry and proportion" (Vit., lib. 3, cap. 1., p. 1). Nothing could be better calculated to ensure this Vitruvian symmetry than by making a module from the whole width of the building, and using that measure for proportioning every part; and it is without doubt greatly due to this that Classic buildings have always been so much admired. There can be very little doubt that all nations who have been sufficiently civilised to require many large and important public buildings, have adopted some such plan of proportioning as that given us by Vitrivius. It is most likely that after his book was published, the methods ot proportioning he gives were never permanently lost. Viollet-le-Duc is of opinion that some such scheme of proportioning was used in the Middle Ages, and although Cæsare Cæsariano was a Renaissance architect, the methods of proportioning that he gives us as being used at Milan Cathedral, were doubtless the traditional ones handed down from the first founding of the Cathedral. I do not think it can be doubted that many of the proportions that Vitruvius gives were originally founded on structural reasons; that is, from the sizes of parts that had been found to bear the weights on them without failure; in fact, Vitruvius tells us that the usual proportion of the architraves of temples was too slight, when the columns were far apart, and that wood must then be used instead of stone or marble.

All these proportions that Vitruvius gives us, and his description of symmetry, are old stories; but the question is this, is this knowledge used? Does every architectural student get his module from the front of his building, and does he use this module to proportion every part? Do architects in practice get a module and use it? What I want to impress on you is this, that this part of æsthetics should be so studied by the student before he practises, that his eye is as impatient of disproportion as a musician's ear is to a false note; the student's eye should, like Michelangelo's, serve him instead of a pair of compasses; not to save his time over designs in deceased styles, but to enable him to make the proportions fine when problems that have never yet been solved come before him.

In early Romanesque days, when the traditions of the Roman architects and of their proportions had probably been temporarily lost, new proportions were adopted, often from logical considerations. The barbarians had noticed that columns always carried something, so in basilicas they carried the columns up to take the trusses of the roof, as the only things there were to be carried. In spite of the early Romanesque work being rude, most impressive internal effects were often obtained, and it is doubtful if the most skilful Gothic ever produced the effect of grandeur that was attained by the best Romanesque.

In Gothic, again, the architect's knowledge of the strength of stone made them adopt different proportions from the old Classic ones; in some of our cathedrals isolated shafts rise to a height that many now would scarcely venture on in cast-iron. There is a Purbeck column in the chapel at the west-end of the north aisle of Lincoln, whose plan is a cross only 18 in. in diameter, which bears half the vaulting: if this were of Vitruvius's proportions, it would be circular, and probably 3 ft. or more in diameter. It has not the grace of a column of the Erectheum, but it is original and striking from its slenderness and from the skill in construction that it suggests. If the proportions that charmed the eye of the most cultivated Romans were the only true proportions, we must still keep to them; but we know they are not, for the proportions of Greek architecture were finer and different, and I think it must be obvious that fine proportions that can charm an educated eye are infinite, though there is a much greater infinity of bad ones.

There is not a reed nor a flowering grass that grows that has not a different proportion and treatment from that of any other species, and yet most of them are lovely: why should we not learn lessons from them? It is partly from the necessity of new proportions, new mouldings, and new methods of enrichment being wanted for iron, that I am anxious to see it more used; this material compels us to find them if iron is to be used æsthetically. Still, it would apply in a lesser degree to every material, old as well as new, if we used them according to our increased knowledge and our present taste. Let me put in what I consider to be a reasonable plea for the study and use of iron. Every architect who has to do with large or complex modern buildings has to make curious shaped stanchions, and other pieces of ironwork, to solve some difficulty in his work, and, as often as not, this stanchion or piece might remain uncovered if it could be brought into an agreeable or striking shape; but the art of doing this has not been learnt, so it is covered with terra-cotta, plain or enamelled, it is built into a brick pier, plastered, or cradled and matchboarded, and no longer tells its tale, nor affords the opportunity for original design. The shapes of parts of buildings is another branch of æsthetics that should be much more studied and practised, so as to conduce to the proper expression of a building. You may want to make a building look sublime or dignified, beautiful or elegant, strong or light, grim or terrible, and the parts or features should conduce to this end, and if you can give originality as well, so much the better. In modern English buildings originality is often shown, and so is grace, but these qualities too often merit the remarks of the critic on a book that professed to contain matter that was original and true: he admitted that it did contain both elements, but said that, unfortunately, the new matter was not true, and the true matter was not new. Any one can be original if he be only impudent enough; any one can be graceful if he is servile enough to copy, but to be both original and graceful requires deep study, much striving, and natural talent.

The Italian Renaissance architects did a good deal to improve and beautify the outlines of buildings and of their parts; but the task of the Italian Renaissance was peculiar—it was mainly to reconquer the knowledge and skill of Classical antiquity; and the Italians started this in so vigorous a way that after a century what they had begun was taken up by the whole of Christendom, and thanks to them we have this priceless treasure to our hand; but the value of the treasure they were reclaiming, and the necessity of devotion to this task, wholly absorbed them. Having got the treasure, it hardly becomes us to object to their admiration of it, which almost amounted to adoration, for without that exaggerated feeling it would probably have been lost; but it no longer behoves us "who rift the hills, and roll the waters, flash the lightnings, weigh the sun," to pose as poor idiots who can never hope to equal Roman antiquity, or even the work of the semi-barbarous Middle Ages. Our mental attitude should be this—we may have our shortcomings, but we shall be able, if we study and strive, to do better than these people. The ferocious Saracens have given us a new phase of architecture, all of it after they created a style, wonderful and much of it beautiful; even the Tartars have given us new phases of architecture in the far East, whilst the Mediævals have shown us that all forms of piers were not restricted to the square, the oblong, and the circular, nor were all the emotions that could be called forth by building exhausted by the Greeks and Romans. The devotion to work that the Italians had at the Renaissance, we should not envy but imitate; and I have no doubt that the same frantic energy was displayed at the beginning of the Gothic Era. Inigo Jones took Petrarch's line as his motto, "I know of no pleasure but knowledge*," and if we would not only take the motto, but act up to it, I cannot

* Altro piacer che conoscer non trovo.

help believing that in a few generations we should make such strides as to astonish the world.

Domes that form a part of the interior effect are mostly ugly or insignificant outside, as we see at the Pantheon, and at Sta. Sophia, but when the constructive skill of architects enabled them to build domes on drums, and to cap the domes with lanterns, the whole feature made up of drum, dome, and lantern, formed, in the hands of the skilful, very beautiful objects, both from the ratio of their parts, from the variety of their shapes, and from the beauty of their outline. In some Gothic spires you see the striving of the architects to correct the baldness and crudity of plain elongated pyramids: all sorts of devices were used, by means of pinnacles and dormers to break the bald line, and to intersperse agreeable shapes at different stages in its height. I particularly speak of the importance of striving after appropriate forms for parts and for outlines, as there is a fashion among some of the new school to use proportions and shapes that might be used by a very low kind of savage; the general outlines of their buildings are without form, while some of the parts are adorned with what might be called architraves, unmoulded, thick, and square in section, or still worse with the outer edge rounded, even when the material is marble; these rude and disproportioned masses are used to enclose a small fireplace, a bas-relief, or a panel of beautiful tiles; in buildings, too, where there is in some parts a certain refinement; this is supposed to show simplicity or power, when it only shows clumsiness and want of taste. The materials that these lumps surround are sometimes in accordance with the shape—bare fire-bricks or clinkers a foot or two wide, put round fireplaces in rooms with elegant cornices, velvet curtains, and inlaid or carved cabinet work; such things are only admissible in a tap-room or a workman's dining-hall. This is not the crimson patch to catch the eye, but the imperial velvet eked out with fustian; though possibly used with the same intention.

It is a little incongruous to see a Greek temple as a park-keeper's lodge, still the parts are well-proportioned and elegant if they be inappropriate; but to see a millionaire's mansion of a rudeness that bespeaks the work of the village bricklayer, carpenter and blacksmith, where perfection should dwell, is not only inconsistent but scandalous. The designing of furniture and of utensils is a useful exercise, for in it you have to meet the exigences of curious shapes and requirements—for instance, in a chest of drawers, a library writing-table, or an umbrella-stand.

At Pompeii everything, from a patty-pan to a gladiator's helmet, was made a more or less beautiful object, while nothing exceeds the grace and dignity of the marble chairs of the Theatre of Bacchus at Athens, though these chairs are perfectly plain and simple, and the bathing-chairs of Caracalla's baths are elegant.

I have also to remind you that architecture cannot be brought into vigorous life again, so long as architects insist on using old forms for beauty that are inseparable from a construction that has been abandoned; so long as this practice persists, so long will architecture be a kind of potted art; to be vigorous, it must learn how to take the materials and construction that would be ordinarily used in buildings for purely practical purposes, and give to these materials and this construction forms that will excite the proper emotions. You must not suppose that I mean that if you have a vast hall, or what not, that because you can put an iron trussed roof over it from wall to wall, that this will make it into a hall that will raise emotions. You will only get a railway platform or a coal-shed. You have got to set your wits to work to see how it is to be properly brought within the pale of æsthetics, and not only as to the shapes and proportions of the parts, but the dividing of the whole by supports. It is probable that if you were obliged to vault a cathedral in stone, with no more money than was necessary, and to have a clearstory to it, that you could not do it cheaper, and perhaps not better, than the Gothic architects did it; but to vault such a building in stone when you could do it much cheaper and better with iron ribs and concrete, is, in my opinion, dilettante art. Groins are not beautiful things, but on the contrary are ugly, and we should wish to obviate their ugliness if we could, but when they were merely unavoidable methods of cheap construction, we admire them for the invention and skill of their architects, and we have, to some extent, got to love even their ugliness from old association; though perhaps the ribs at Westminster Abbey, as seen from the west end, are not offensive.

One of the things I have repeatedly recommended for learning architecture is paraphrasing fine buildings. Writers who want to get a good style paraphrase the best authors of their own country, besides making translations when they know other languages. We do not want to paraphrase Sir Thomas Browne to learn to write his ponderous Latin style as Dr. Johnson did, pregnant though it be with lofty and noble thoughts. We do not even want to learn Addison's, Goldsmith's, De Quincey's, J. A. Symonds', nor Froude's style; but merely to learn the art of writing English, and to find out the methods by which these great writers were able to produce their effects, for, as Pope says:—

"Smoothness in writing flows from art, not chance,
As those move easiest who have learnt to dance."

The language we want to use is the best language of the day, and the style we want is our own. And so it is with our architecture; we want for the ordinary buildings of life to give them an agreeable colloquial style, capable, however, of expressing the emotions that should be shown if we have wit enough to use the style properly. We may want to express a look of dignity, stateliness, or grace; or we may only want to express mere homeliness, cheerfulness, or comfort.

For important buildings that are devoted to some high ideal purpose, we want a dignified, or, if we can produce it, a sublime style. There are examples of such buildings in Greece, in the old Roman dominions, and in the Renaissance buildings of Italy, but their main structural forms are now absurd. We neither want an imitation of wooden construction, nor porticoes as a protection from the sun, nor useless attached columns, making the building look like a temple walled up between the columns. Classic columns are often beautiful enough as an æsthetic treatment of a member to support weight, but they are by no means beautiful enough to be used as ornament when they are not wanted structurally, like the pots and pans the Pisans took at Majorca and Minorca, and put on to the outside of their buildings; nor are they suggestive, like the fetters with which the church at Toledo is draped. Some of the Italian palaces are not disfigured with useless columns, but the windows are little peripteral temples—pediments and all—with the middle columns knocked out for light. This was, of course, merely an enlargement of a Roman invention, that can be seen at Pompeii and at Nismes.

Viollet-le-Duc wrote a humorous description of the advance of architectecture; he said: "All architects were unanimous in their opinion that the art ought to advance, but there their efforts ended. It was like a scene at the opera, where a band of soldiers sang for a quarter of an hour, 'Let us march,' but at the fall of the curtain they were in the same place as when it rose."

If architecture never had moved, we might give it up in despair, and content ourselves with paraphrases, but there was a great æsthetic advance from the Stonehenge construction to a Greek temple. There was a great constructive advance from the Greek temple to the Pantheon and the Baths of Caracalla, and from these to the dome of Sta. Sophia, carried on pendentives; and from this, again, to the Cathedrals of Amiens, Rheims, or Beauvais: not to speak of the new emotional effects produced, and the attempt to make cathedrals into microcosms in which all the aspirations of mankind were symbolically represented, and were shown to culminate in Heaven.

We can hardly believe that Christendom has been struck with imbecility in this direction only. Even if we think that the aspirations of mankind are now of the groveiling order, we must also think that there must be something wrong in the method pursued in architecture. We know that metaphysics, the old philosophy, is much where it was three thousand years ago, while natural philosophy, being pursued by the inductive method, has, since the fifteenth century, not only found out the system of our universe, but has given man steam and electricity as his supernatural servants. To speak of what steam can do, in one direction only when linked to machinery, it is said that the calico manufacturers of England could, in a year, weave a night-gown for our globe. We may well ask ourselves what can be the reason of this deadness of soul to the highest forms of art. We know that in this triumph of mechanical invention we are surrounded by ugliness, and at present probably necessary ugliness, and that all mechanical perfection seems to run in that way. We might use modern musical instruments as a standard, and say of anything, it was as ugly as a modern musical instrument, for the last new flute is like a crank-board of a system of bells. We can generally say the same of the structures of the modern military and civil engineers; fortifications are like molehills, bridges are colossal chests, coffins, or the hollow spits for little birds, or a row of pterodactyls strung through the outstretched wings; only we must not speak ill of the bridge that carries us: but we can hardly make the same excuse for the meanness of our own clothes, and for the shape of everything that is in daily use. Our carriages of all kinds, short of heavy waggons and drays, are the perfection of meanness. I am afraid that Liszt's reason is the true cause. He says, the constant and close pursuit of gain is more demoralising to human beings than a little thieving, and illustrates it by the passion for music possessed by the gypsies of Hungary and Bohemia, who are not altogether free from that peccadillo. It is the possession of noble ambitions or lofty aspirations that not only distinguish great men from the herd, but distinguish epochs, and not their freedom from weakness or vice. At times when high aspirations prevail, or just after such times, the fine arts flourish; when they languish, the fine arts decline. It can hardly be said that there is any noble ambition or high aspiration that animates society as a whole just now, though doubtless there are individual ambitions and aspirations as high as ever existed among us, particularly on the lines of benevolence and science. If one may judge of one's own time, it seems that its ideal is the land of Cocagne, where the little pigs run about ready roasted asking people to eat them.

I think that Horace's paraphrase of Tyrtæus' hymn—

"For our own native land to die
Is glorious and sweet;"

contains a nobler aspiration than that of—

"Eight hours' work and eight hours' play,
Eight hours' sleep and eight shillings a day."

Nothing prevents the individual from having noble ambitions and high aspirations, and I do not see why the architects may not cherish them; to be poor and disregarded is perhaps a good soil for the virtues to grow in; most of the Greek philosophers were in this plight, but, as the Italian country ballad says, "Poverty is no bar to nobility of soul."* No one can do more than learn, strive, and suffer, and if there are no great buildings to be raised to high ideals, each architect can aim at giving the highest proper expression to the building he may have to design, however humble it may be, and he can devote himself to trying to put life into architecture again.

As the poets study the art of poetry from the earliest to the latest poems, so must the architects learn the æsthetics of their art from every source.

The first and most important point is this, whether it be in the plan, the construction, or the æsthetics, to avoid foolishness; there is very little folly in Greek work or in Early Gothic—both people were too logical; but there is plenty in Roman work. The Romans were born constructors, and were not likely to overlook the usefulness of the arch, nor the saving of cost it effected, but they were not blessed with the artistic instinct; still they felt that the Greeks possessed it, and much of the Roman work looks as if it might have been built by an engineer, and then turned over to the art-architect or decorator, who proceeded to overlay the real construction with a bad paraphrase of Greek work. The Renaissance architects avowedly copied Roman architecture as far as they could, but being naturally artistic, and being mostly painters or sculptors, they made their paraphrases more elegant than the Roman model, even if they lost some dignity in the process.

The next is never to leave out what is wanted, because you do not know how to treat it becomingly; and the third is, never to do anything to make people stare, whether this be in the plan, the construction, or the æsthetics, for besides being a poor device—it first abstracts the attention from the merits of the work, and then distracts the mind from it; as the mind employs itself in trying to solve the mechanical trick. The great object in all æsthetic work is to make the whole look simple, natural, and inevitable. A building so endowed, induces a calmness of mind in the beholder, and entices him to investigate the work more closely, and may eventually lead him to admiration and a higher kind of wonder.

In a mansion I once went over, I went down a staircase to the housekeeper's room and stores, but to get to the rest of the basement I had to go up another to the ground floor, and then down

* La povertà non guastà gentilezza.

again to get into the rest of the basement by another staircase: this was very striking, as the house was only just built, but I doubt if it was convenient. Some public buildings are like the labyrinth at Crete, you want a clue to find your way out. Structural devices to arrest attention are too well known to require mentioning, such as columns tied into knots, twisted together, cork-screwed, or knock-kneed; Bernini's cork-screw columns in the baldachino of St. Peter's are simply ugly; parts held up by suspension that should go to the ground, and even a heavy-looking superstructure supported on that which looks too slight, like the lace-work of the Ducal Palace at Venice, with a nearly dead wall over it, or even the Ca d'Oro; and the same is the case where the upper part of a building is supported by what looks like insufficient corbelling. It is a fundamental axiom that every building should look amply secure; and all such devices to catch the eye are not much better than that one of Wilars de Honecort, of making the wooden or brazen eagle of a lectern turn its head to the Ambo when the Gospels were read. It might have been looked on as a miracle by the rustics of those days, but the trick was a simple one, the officiating priest put his foot on a treadle.

The two great objects to aim at are breadth and simplicity. I admit that breadth is mostly unattainable in façades in England, and certainly is entirely so in all but a few favoured sites in London, for the whole front is mostly wanted to be of glass, when the width is restricted, to sufficiently light the rooms; but we can all aim at simplicity. If this statement had never been made before, we should all say, What can be easier? but it wants a past master in the art to succeed, and everyone who has tried simplicity in his designs must have found out the almost insuperable difficulty of getting it, and has mostly been driven by his own incapacity to be much more complex than he wanted to be; for it is not plainness but artistic simplicity that is wanted. The dead wall with a hole in it which came right by chance, I mentioned before; to succeed by trial in making an equally perfect harmony where the size and proportions of the dead-wall are different, would take ten times as long as to cover the whole side with elaborate forms. I may also mention in the case referred to, that something more is mostly wanted to give a more human aspect to the composition—a cornice and a moulding round the window for example, or what not. Perfect æsthetic simplicity looks, too, so easy, so natural, so inevitable, until you try to get it; and then you find that in the examples you remember that "The great art has been to hide the art." I think every architect, when he first looked at a Doric temple, or even at a close paraphrase on a clear day in sunshiny weather, has said to himself, if those Greeks had not lived before me I should certainly have done this very thing and been famous for ever.

Arago said of Newton that he was not only the greatest but the luckiest of all philosophers, for the laws of the universe could only be found out once; but had the law of gravity been found out before Newton's time we may be sure that that sublime mind with that perfect training, would have discovered some law that was next in importance; so though we may give the credit of luck to the inventor of the Doric temple, we may be sure that he would have done something fine had he practised after its invention. Do not, then, console yourselves with the thought that elegant simplicity was exhausted by the Greek temple, but see if you cannot train yourselves to rival it with the buildings you have to do to-day. We do not want Greek temples here; they are as unfitted to our wants as the shapes of the mouldings are to our light and atmosphere, and yet simple shapes and simple mouldings that would tell their tale in England are probably infinite, but, as yet, no one has solved the problem. We never tire of simplicity, and as Count Carnaro, the long-lived devotee of spare diet, said, "I more enjoy the flavour of my little bit of bread than the other guests at the banquet do the most exquisite dishes." We have all heard of the disgust of the man fed entirely on eel pie. His final exclamation "What, always eel pie?" has become proverbial.

Every orator will tell you that it is much easier to rival Cicero than Demosthenes; for what is true in architecture is also true in speaking. Swift says of simplicity, "Without which no human performance can arrive to any great perfection." Those who aim high cannot do better than take to heart Horace's advice to the Roman poets to study Greek models day and night: he probably followed his own advice, and his works have lived some 1900 years, and besides learning style, his Greek models were probably of use to him. Much of his poetry is said to be paraphrased from the Greek; "Dulce et decorum est pro patria mori"* certainly was from Tyrtæus. To English architects Greek architecture can be of no practical use. Greek buildings are neither suited to our climate nor our habits, and all their lovely forms and exquisite mouldings are for the bulk of the year the dullest and least effective possible. The Athenian public was the only one we know who had a perfectly refined and cultivated taste, though the Florentine was the nearest approach to such a public in modern times.

Uneducated tastes mostly look for outward signs of labour and display. If any architect could now build like Ictinus or Mnesicles he would probably have the fewest admirers of any architect, still those few would be worth all the rest. Nothing can be so good for the English architect to study as Greek work; he will learn some of the secrets of its success, some of its grand style, and he may be able to make his architecture as pure and simple as that of Athens, though absolutely and entirely different. Soane, Wilkins, Cockerell, and Gandy were the great students of Greek architecture of their day, and there is a dignity and charm about their works that is scarcely found elsewhere. A philosopher said "All the reward that all the workers at the Pyramids got, was the admiration that they excite and have excited," and every architect should think that if he has done a bit of good work, somebody has probably seen it, or will see it, to whom it will give delight, and who will say, "The man who did this was an artist." It may even be that some fragment may be preserved, and be like a scrap of poetry that has become one of those

> "jewels five words long
> That on the outstretch'd finger of old Time
> Sparkle for ever."

Casts of those crumbling pilaster caps of the Erectheum are precious things, even in a drawing-room adorned with the finest works of the modern painter, sculptor, and statuary; they tell out with a purity, a dignity, and a style that makes us treat them with the respect we should treat one of the old heroes or poets who came from the Elysian fields.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

SIMPLICITY IN ARCHITECTURE.

AN ordinary meeting of the Royal Institute of British Architects took place on Monday last, at 9, Conduit-street, Mr. F. C. Penrose, M.A. (President), in the chair.

Mr. W. H. White (Secretary) read a list of candidates recommended as Associates.

The Secretary also read the by-law with reference to the nomination by the Council of the Royal Gold Medallist, the day of election being fixed as the 11th prox.

The President then said it was his duty to announce that the Council had elected Mr. James Brooks as the gentleman whose name should be submitted to Her Majesty the Queen as a fit recipient of the Royal Gold Medal for his executed works as an architect.

The President remarked that they were about to hear some papers on the subject of "The Value of Simplicity in Works of Architecture." Some gentlemen who had intended to come that evening were unable to be present, and he had received the following telegram:—"Sorry cannot come, but can't. Count me against architectural confectionery and fidgetty façades. — WALTER CRANE."

Mr. Halsey R. Ricardo said that, in the words of Mr. Ruskin, "Architecture is the art which so disposes and adorns the edifices raised by man, for whatsoever uses, that the sight of them may contribute to his mental health, power, and pleasure." He stated that "all architecture proposes an effect on the human mind, not merely a service to the human frame." And we knew that these words were true. This effect might be the expression of the individuality of the architect, or the owner of the building, or a fusion of their associated individualities. Mainly it was the architect who spoke through his work; the building-owner set him the conditions, but their resolution was his occupation. In architecture, man's individuality was swiftly discernible. Let not a man think to conceal his identity: a moulding betrayed him; the preparation for a cornice or the stopping of a string-course proclaimed him. Living architecture was that which answered the requirements of the day. The requirements might be modest and sensible, and then the architecture would be beautiful and strong; they might be affected and individual, and then the architecture would be so far paralysed; they might be extravagant and vulgar, and the architecture would be violent and vulgar in response. Early in the century we threw off the weight of 300 years, and masquerading as Perpendicular Goths, went about our business of the day. Then some very superior people shook off a couple more centuries, and attempted to play at being knights out of armour. Time, the policeman, moved us on, and we proceeded to play just round the corner. The 150 years or so seemed a bridgable difference, and Christopher Wren a good serviceable stock on which we could graft what of Italian, Dutch, German, or other, we might choose. And at this point we were now arrived. The whole past was a vast treasury for us to draw upon. But this wide range of choice had been attained with the loss of tradition. And this want of traditional support had had the result of clogging and obscuring the architect's mind with detail. The traditional methods had been obliterated; but there was a strong tendency to adopt the opinion that detail would pull one through, even if one could not get the masses right. A short while ago the Terrace in High-street, Kensington, came into the hands of the builder. The buildings, low and out of date, stood back from the road, and their reticence did something to counteract the unpleasant constricted feeling that one had in the High-street. The houses were pulled down, and a large block erected on the advanced frontage. The ground floor built in the "practical" style—brick party-walls, some steel knitting needles, and some sheets of plate-glass; above this, four stories of domestic architecture in the style of "the man in the street." The building was curiously illustrative of the temper of the day. It was devoid of proportion, and covered with knick-knacks and the general frippery of architectural ornamentation. Across the road, and forming its north side, were two blocks of buildings, called Lower Phillimore-place. They were not conspicuous examples of good proportion, but they were simple, quiet, and refined. They looked with scorn at the blazing vulgarity of the newcomer opposite. Seventy years ago we should have called them builders' houses of a good type; to-day we called them dull. Buildings, like the drama, should be pregnant—condensed—in their ornamentation. Simplicity in architecture meant good art in architecture, and good art in architecture meant perfect adaptation to the circumstances surrounding it. Good art was therefore pre-eminently practical. All this welter of indiscriminate ornament was not practical.

Mr. Basil Champneys said he had been asked to speak on the subject of Simplicity in the Art of Architecture, specially with reference to churches and country houses; though the principle of simplicity was really universally applicable to all architectural art whatever. There were two positions which it was desirable that we should establish in the first instance: the one that simplicity was a note of the highest art everywhere and in all its branches; and the other, that it was specially characteristic of the English genius. In the fourteenth century, when foreign art was developing into the vagaries of the Flamboyant in France and the neighbouring countries, and in Germany into a variety of ingenious extravagancies, in England the invention of the Perpendicular held eccentricity in check and resulted in work which erred as often on the side of severity as of exuberance. A work such as the Chapel of King's College, Cambridge, with all its elaboration and extreme development of constructional art in its vaulting, was still essentially one of the simplest, as it was one of the grandest, of Mediæval buildings. If such a work as Henry VII.'s chapel be quoted against him, he should answer that, beautiful as it was, it showed the note of decadence, and was evidence only of the exuberance into which art might run when the restraint of a wholesome traditional principle was removed. But, putting aside these more conspicuous examples, one could appeal with even greater confidence to the vernacular examples of ecclesiastical art, to the dignified modesty of thousands of village churches of no special fame, all of which, almost without exception, showed unobtrusively some note of true inventiveness and some degree of poetic charm. An idea was unfortunately prevalent that simplicity in art was

* Hor., Lib. 3, Ode 213, "For our dear native land to die is glorious and sweet."—Sir Theodore Martin's translation.

usually to be found in an inverse ratio to inventiveness. He believed that the exact opposite was true, and that if necessity was the mother of invention, simplicity was daughter of inventiveness. From first to last the law held good, that every building, to be a work of art, must originate in one central idea—what the French called the "*idée mère*"; that to this idea all that the inventive powers might evolve must be strictly subordinated, and that it was better to apparently fail in inventiveness than actually to fail in unity and keeping. The popular demand for so-called originality was perhaps the most dangerous influence against which the art of the time had to struggle; nor was it more noxious than absolutely unreasonable. True inventiveness was always unconscious; nor could anyone by taking thought increase his originality one whit more than he could add a cubit to his stature. No art had ever progressed by jerks; healthy progress had always been smooth, gradual, and tentatively modest; and this was especially true of architecture, which could never be largely divorced from precedent, and relied so largely for its effect on associated ideas. Style had been defined by someone as "having plenty to say." It would be more correct to say that one of the essential conditions for writing a good style was to have plenty of material; perhaps another condition might be not to try to say too much. These remarks had a very direct application to the question of architectural simplicity. Architecture, of all the arts, was the most firmly based on the practical. In the design of every building the primary problem was to fulfil certain definite practical requirements according to established constructional laws, and it was on the spirit in which such problems were met that style in architecture mainly depended. If they were met honestly and simply, the thing to be done being held primarily in view and sound laws of construction loyally obeyed, at least the conditions of good architecture were present. In architecture, unity and simplicity were so closely allied as to be almost interchangeable terms. But the only condition on which true and complete unity in architecture could be obtained was that the design shall have been originally conceived as one complete whole. One often came upon proposals which seemed to imply that a design might be taken to pieces, and that the elevation was to follow a plan previously and independently made. This was a dangerous heresy. A plan was a good plan if, fulfilling the primary practical requirements of the scheme, it involved by legitimate construction a building both internally and externally good. Unity of effect involved and implied unity of conception.

Mr. Francis C. Penrose, in a short paper on the same subject (read by Mr. Caröe) said that in an age of such varied and complicated wants as the present, the primitive simplicity of our Norman and Saxon ancestors could not be maintained, nor would it be, to that extent, desirable. Every historic style of architecture had passed through the phases of its first uneducated dawn, then its meridian excellence, and thence has sunk to a more or less complete state of decadence. There had been a rude but grand kind of simplicity in the first period; then the well-ordered and chastened simplicity of the culminating stage, and invariably a loss of this quality at the close. But, nevertheless, in England at least, a resolute stand was in some very important instances made against the prevailing tendency to complication. Witness the works of William of Wykeham, in Winchester Cathedral and elsewhere, and of the architect, whoever he was, who built King's College Chapel. A noble stand was also made against the degeneracy of the Renaissance in England by Inigo Jones and Sir Christopher Wren, and in France by Claude Perrault in the Eastern front of the Louvre. Besides these examples of stemming the adverse current, we had encouragement derived from the sequence of the works of nature. Consider the gradation which we found between the pendant violet and cowslip of spring, the severe concentric majesty of the summer rose, and the radiating flowers of autumn; but none of these, with all their variation of character, could we charge with want of simplicity. The examples and analogy above given ought to encourage us to feel assured that even though a tendency adverse to simplicity had become prevalent, it was quite capable of being corrected. Let us, therefore, endeavour to establish the means by which it might be done. A prime essential was the rule that no particle of ornament, whether decoration be abundant or scanty, should be used without a definite aim. Let us next consider the advantage of a well-ordered and simple plan. One of the greatest charms in viewing a building arose from the exercise of the mind, when the orthographic aspect was distorted by perspective, in recovering the true shape or plan from the image presented to the eye. In a well-balanced architectural composition, this process could be gone through satisfactorily before the mind was fatigued by it. As to the quality of simplicity in the orthographic aspect, the first principle should be the expression of one central idea connected with the purpose of the building; and any subordinate compositions should have reference to the main idea, and by far the larger part of the ornamentation used should be grouped in connexion with it. It might be instructive to point out how very little some of the finest works of architecture owed to complexity of structure and ornament. In the Propylæa there was no ornamental carving whatever. Our two noblest cathedral fronts, Lincoln and Peterborough, owed their imposing and beautiful effect to simple forms. The Sainte Chapelle looked far more impressive when he first saw it, with the windows and floor quite plain, than after its modern elaboration with paint, gilding, and tiles. Taking for granted the desire to work out a design in due simplicity, the method which had occurred to him was something of the following nature. Having well thought out the capabilities of the plan, commence the elevation on quite a small scale—such, for instance, as the object would appear at a distance equal to ten or twelve times the height. On so small a scale none but the principal features would be distinct. Sketch these into shape before any enlargement of scale was thought of. Then adopt scales representing the building at nearer distances by steps, until the scale was sufficiently large to exhibit roughly all the detail that might seem desirable. When this had been discussed and got into shape it would be desirable to leave the elevation alone for such interval as might be wanted to attend to some other of the requirements of the building, and then, with a fresh eye, return to the elevations and compare the last enlarged sketching with the first small scale drafts, and carefully consider whether in the subsequent elaboration the design had at all lost its primitive simplicity, and, if so, cut out all excrescences which might have caused such departure. There was ample room for true originality by the exercise of the restraint and the condensation of thought referred to above, and ample scope for its exhibition by skilful planning and grouping, so that its merit might at once be evident to any thoughtful observer when comparing any such work with the florid unmeaning designs, of which we had so many, worthy of the speculative builder, and lead him to say, "This seems to be the work of an architect."

Mr. H. H. Statham proposed a vote of thanks to the President, and to the other two gentlemen, who, they were all sorry to feel, were not members of the Institute, but who had contributed such excellent and thoughtful papers upon a subject, the consideration of which was certainly very much called for at present. Having regard to the great majority of the buildings which were hurried on in the present day, they were characterised by an exuberance of ill-thought-out ornament, which he was afraid was to some extent due to the increasing prevalence of the system of competition, which almost invariably led to a desire to produce a design that should attract attention before anything else. At the same time, it was of no particular use that he, who opened the discussion, should agree with everything that had been said. He thought there were points where more was meant than met the ear, and he should like to suggest another side to the question. He believed that the more thoughtful minority of the architects, or some of them, had been perhaps driven to the opposite extreme from florid architecture, and were rather in danger of drifting into what might be termed an affectation of simplicity. Before bringing forward one particular instance of this, he would ask, in the first place, were the critics altogether consistent themselves? They were wont to consider thoroughfares like the old Georgian streets as dull, but they were now told that it was stupid to have such an opinion. Mr. Ricardo had mentioned an instance in Lower Phillimore-place, where there was much more sensible architecture on one side than in the new buildings opposite. He knew an old Georgian street in which were red-brick houses with no ornament of any kind, but with a cement string carried from one end to the other. An architect came and made a new front to one of these houses, putting in gables at the top, and a very big window with plaster decoration over it. He was so anxious to obtain curves that he put a bow-window in the ground story by tucking the bow back to the inside of the walls. That was on the south side of Great George-street, and the architect was his friend Mr. Ricardo. He (the speaker) was not shocked at that in the least; on the contrary, every time he passed it "contributed to his mental health, power, and pleasure." It was putting something very interesting and picturesque into that which he maintained was a very dull street. At the same time he did not see how Mr. Ricardo's practice squared with his preaching. To come to the other point, as to the affectation of simplicity, he was talking one day to a friend who was one of the "simple-minded" architects. This gentleman was complaining of the vulgarity of modern architecture, and like Vivien, in the "Idylls of the King,"

> . . . "Let his tongue
> Rage like a fire among the noblest names."

At last he pulled him up, and asked whose architecture he did admire, and then he mentioned one person whom he would style X. Y.—a man whose name many there had scarcely heard of. He had discovered, however, that to admire a building of X. Y.'s was one of the proofs of being among the truly elect. Not having seen any of this gentleman's buildings, he asked his friend where one could be seen. The answer was, "Go and look at a small house in a certain square." He went there, and found a small semi-detached house of excellent brickwork. It was always refreshing to see excellent brickwork, but there was not one feature, one moulding, or any of what were usually called architectural features from top to bottom of the front, except a half-projecting course of bricks to make the semblance of a string. It was, of course, very easy on these terms to avoid bad taste; but instead of simplicity in architecture, it was rather simplicity without architecture. He found among the examples on the walls a drawing of Newgate, and it was a curious indication of the rate at which things had gone that about ten years ago, when giving a lecture to a general audience, and instancing Newgate as an example of expression in architecture, a row of young architectural students at the top of the room began to laugh. To them he replied, "Dance was told to design a gaol, and he made the building as like a gaol as possible." He was right, but surely it was only in that respect that Newgate could be admired as a simple building. They were surely not going to have Newgate held up to them because its simplicity of architecture was an example worth imitating in every building; as a gaol design it was admirable because it was so forbidding. Let them consider in a few words what simplicity in architecture really meant. They had had it hinted most truly by Mr. Champneys—with whom he agreed—that unity and simplicity were so closely allied as to be almost interchangeable terms. If they came to think what that led to they would see that it would allow for a very large amount of elaboration. It was a dictum of Sir Charles Barry, who was the greatest English architect since Wren's time, that he did not object to any amount of richness in a building, provided it was consistently carried out. They might take two views of simplicity; in the first place, with regard to the general design of a building, and secondly, with regard to detail. With regard to general design, it should be well balanced, and in an important building symmetrical, and not cut up simply for the sake of producing what were called picturesque sky-lines. In the case of detail, what was required was to have the detail thoughtfully and well designed, and proper to its place. Surely that was one reason for preferring what was termed simplicity, because the designing of thoroughly good ornamental detail was a difficult thing, requiring much thought. It was one of the curses of the present day that there was a quantity of bad and thoughtless ornament put on simply because a man wanted to put something to attract attention, and did not know what else to put. But if they came to the case of a building where there had been time and will to give thought to the composition of the ornament they might go to any amount of richness and still have simplicity. The Taj Mahal, for instance, might be called, on Mr. Champneys' principle, a simple building, possessing what he had termed the *idée mère*—everything being subordinated to the original idea. He would not say that Henry VII.'s Chapel was not simple. He had a French friend who came over a year or two ago for the purpose of studying architecture in London and who said that nothing he had seen here had struck him as being so beautiful as the interior

of Henry VII.'s Chapel. That was a sort of indication that it had a power over men, and its richness was consistent, because, though it was the very excess of elaboration, it might be claimed as one of the buildings which, in its general idea, was connected logically, and therefore simple, and only elaborated in proper subordination to the general features. He would like particularly to thank the President for the most suggestive remark he had made on the mode of designing a building—viz., studying it in block on a small scale first, and then studying the details on a larger scale. He thought that young architects who were present would do well to lay that advice to heart. It was a most useful suggestion, and one which was not sufficiently kept before the minds of people in designing.

Mr. Alma Tadema, in seconding the vote of thanks, said that a work of art should look like one construction. The great secret of Greek architecture seemed to be that their ornaments were only lines. It was true that a building like Henry VII.'s Chapel was beautiful, and that its ornaments did not exactly destroy the simplicity of its proportions, but still it reminded him a little of the Maori, who still remained a beautiful man, although he was tatooed. Unity and simplicity ought to be beautiful. He had always considered the plan, the section and the elevation as being the Three Graces of architecture, which could not be separated. In London, the pity was that architects had not fair play on account of the climate, or want of climate. He would conclude by saying that though simplicity was one of the great laws of art, poverty was not art.

A communication was read from Mr. Ince, in which he wrote that simplicity was not by itself meritorious, and that it was after all a relative term. If simplicity were meritorious, Gower-street would lay claim to virtue; but what was wanted was to produce a fine effect by simple means.

Mr. H. W. Primrose said he was reminded of the old phrase "ars est celare artem," when they were discussing the question of simplicity. Artlessness was one thing, and simplicity another. The former was at the bottom of the scale, and the latter at the top.

Mr. W. Young thought it was a healthy sign of the Institute that one night had been given up to discuss the subject of simplicity in architecture. The majority of the work of the present day was characterised by a restlessness and disregard of all the old principles on which architecture had been built up, and the great social upheavals now going on were characteristic of the same principle. He thanked Mr. Alma Tadema for the words "simplicity, but no poverty." It seemed that they were in want of a true definition of the word "simplicity," and they ought to arrive at some common understanding of what was meant by it. He had two meanings for it. First, there was a simplicity begotten by indifference out of ignorance, or simplicity by faddism out of conceit; and, on the other hand, there was a simplicity, by deep study, out of great skill. The one was the simplicity of Simple Simon; the other the simplicity of wisdom. That simplicity was not one of Ruskin's Seven Lamps, but it was one of the lamps known to the old architects, from the time of the ancient Greeks down to the present day. Sometimes the light had burnt dimly, but it had never gone out, and there was no better course than to go back to early principles, and endow their buildings with simplicity. Simplicity should not be confined only to the elevation, but should also extend to the plan. In public buildings of recent years, simplicity of plan had reached a high point. In domestic buildings, again, he looked at the view of one and found it marked by much simplicity, but in studying the plan he found it most intricate. There was a certain amount of moderation desirable in simplicity, as in everything else. It might be that to arrive at true simplicity, condensation was necessary, just as in writing an essay, the man who was not in a hurry would go through it, and by condensing it produce simplicity. It might, however, be carried too far, just as elaboration might. He had looked at buildings which were so simple that the simplicity had become most objectionable. Enthusiasm should be tempered by simplicity, and simplicity by moderation.

Mr. Wm. White, F.S.A., thought that one of the elements in the matter had been lost sight of, viz., that of repose. Proportion was one of the grandest elements in architecture, and good proportion would give repose.

Mr. E. R. Robson thought that the idea desired to be conveyed might be better expressed by the use of the terms "reticence" or "self-restraint."

The President remarked that the observations of the different speakers had been chiefly directed to definition. He was sure that the author of the paper had not meant a blank wall, or anything which did not require the exercise of the faculties of the designer or observer.

The vote of thanks was then put, and carried by acclamation.

Mr. Champneys replied for himself and the authors of the other papers. He felt that they ought to have started by the universally admitted definition of what simplicity was. In fact, he would not mind exchanging the term for reticence or restraint, or a variety of other terms going in the same direction.

The President announced that the next meeting would take place on Monday, the 25th inst., when Mr. T. W. Aldwinckle would read a paper on "Fever Hospitals."

The proceedings then terminated.

MAGAZINES AND REVIEWS.*

THE *Art Journal* publishes the first instalment of an essay on "St. Sophia," by Mr. Richard Davey; critical and historical, with some illustrations. Mr. Wedmore writes on the art of the poster, illustrated chiefly from French examples. The cleverness of most of these examples is a good deal dashed with the kind of vulgarity which in France would be called *chic*. M. Puvis de Chavannes and Albert Moore are the subjects of two short articles; in regard to the former the writer, M. Bernac, draws attention to a certain degree of "new departure" in the style and colouring of the painter's recent works. "Progress in Cotton Printing" is the subject of a practical article by Mr. Lewis F. Day.

The *Studio* contains a long and well illustrated article on the Art of Mr. J. W. Waterhouse, and also the unusual incident of a distinctly architectural article, "An Ideal Suburban House," by an architect, Mr. H. Baillie Scott, in the plan of which the only water-closet on the ground floor opens out of the scullery; a truly delightful arrangement. Is that "ideal"? From an artistic point of view there is much that is good in the suggestions and illustrations, but it is the fault of the artistic architect of the day that he seems to have generally no sense of sanitary and convenient planning.

The *Artist* is such a medley of scraps, many of them interesting, that it is impossible to lay hold of anything special in it, except an article on "The Past, Present, and Future of Colour-Printing," which is the only consecutive piece of writing of any length. The paper contains a number of heterogeneous illustrations, including reproductions from Michelangelo's sketches, which are dotted about the pages, and are always interesting to see. These are from a sketch-book in a private collection.

The *Engineering Magazine* includes an article by Mr. Goodyear on "First Principles in Architecture"—rather late to come back to that now. He thinks "the coming architect is an engineer." The engineer will have much to learn first. There are some good remarks in the article, however, but we rather dread "first principles." They generally mean negation of everything. Mr. Haupt's article on "Planning the Site for a City" is of more interest for America than for England, where we never have the chance of doing such a thing. Would that we had: what a city might be made! Mr. Gardner's article on the "Architecture of Municipal Buildings" is a very good one, rendered more interesting by a number of comparative illustrations, old and new.

The Reliquary and Illustrated Archæologist for January (Quarterly) contains a great deal of interesting archæological information, well and largely illustrated. Among the contents are an article on "Wall Paintings at Kirkly Hall," and a "Survey of the Existing Remains of the Priory Church of Holy Trinity, Micklegate, York."

The Journal of the Royal Society of Antiquaries of Ireland includes an article on the "Round Towers in Northern Clare" (the third of a series), by Mr. T. J. Westropp, with some illustrations; and one on the "Origins of Prehistoric Ornament in Ireland," by Mr. George Coffey. To this, which is of some interest, we may return.

In the *National Review* Mr. Beachcroft and Mr. H. P. Harris discuss at considerable length "The Work and Policy of the London County Council," the article being practically a defence of the point of view of the "Moderates." In regard to the most important point at this moment, the water supply question, they point out that, on the supposition of the County Council carrying out the "Progressive" policy of buying up the water companies, we are not told where the purchase-money is to come from, and they calculate that the provision of it will probably mean a permanent additional rate of at least 4d. in the pound. This, as they say, is not a reassuring prospect for ratepayers, who are admonished to endeavour to realise the probable results of this policy on their pockets before they commit themselves to supporting it. The authors, however, fully realise that some new departure in regard to the regulation of London water supply is imperative, and in the alternative of deciding against the County Council as the purveyors of water, they suggest the compulsory amalgamation of the water companies under the management of a Water Trust appointed by Parliament; an alternative certainly worth serious consideration. It is to be regretted that they rather weaken their case and their article by adopting such a tone of confidence in regard to the illusory Report of the Royal Commission on Water Supply; a document which, as we have more than once pointed out, is practically an advocate's *couleur de rose* Report in the interests of the water companies. The same number contains an interesting account by Mrs. St. Loe Strachey, of a visit to Dashur, under the guidance of Mr. de Morgan, the director of the Ghizeh Museum, to see the tombs of the Egyptian princesses of the XIIth Dynasty, which he has had the good fortune to bring to light.

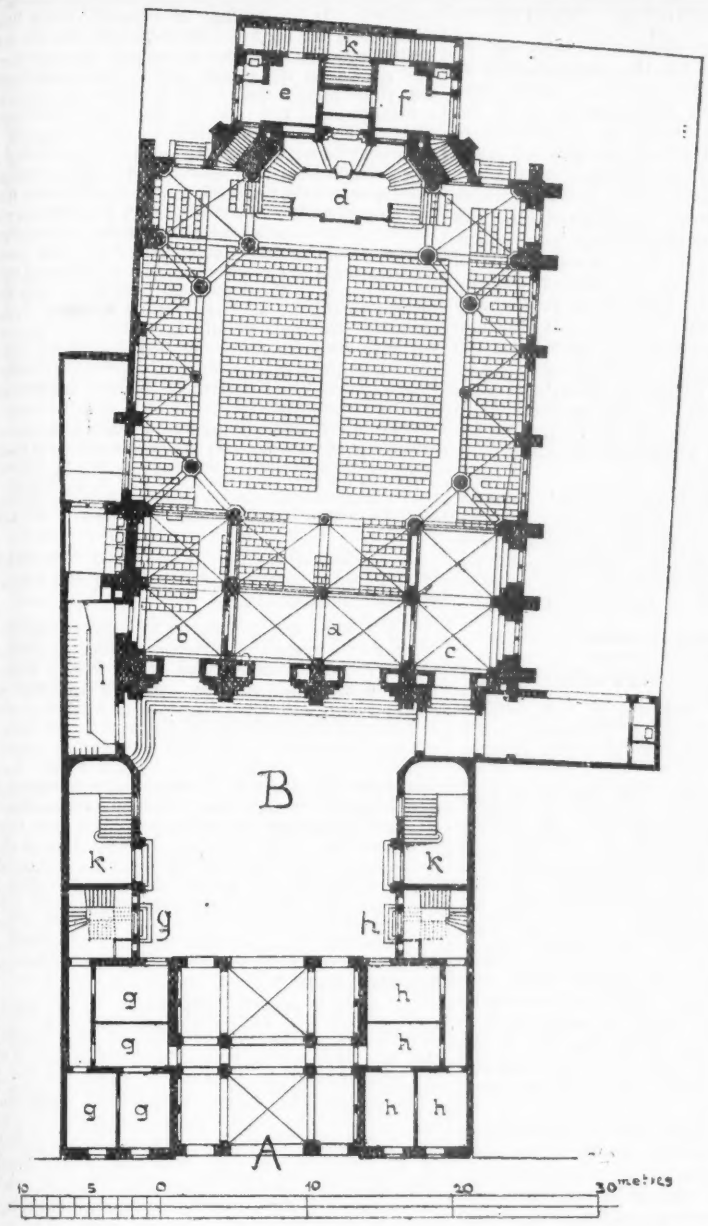
In *Scribner's Magazine* Mr. Robert Grant's article on "The Art of Living—the Dwelling," is not really concerned very much with "the dwelling" in its concrete sense; but he does diverge to this in the course of the article, to remark that the American architect has been showing what he can do of late years in dwelling-houses, and that "much of it is fine and some deadly; for the display includes not merely the generally tasteful and artistic conceptions of our trained native architects, who have studied in Paris" [nothing else, apparently, counts for "training"], "but the raw notions of all the builders of custom-made houses who, recognising the public desire for striking and original effects, are bent on surpassing one another." The not unnatural results are briefly described in strong but decorous language. "As there is no law which prevents one from building or buying an ugly house, and as the architect suffers no penalty for his crime, our national house architecture may be said to be working out its own salvation at the public expense." Is it not pretty much the same in all modern cities? Mr. W. C. Brownell (the gentleman who, exalting French art at the expense of English, printed a Turner for a Claude among the illustrations to a former article, and refused to acknowledge or correct his blunder) contributes an article on "The Recent Work of Elihu Vedder," an artist in ideal figure subjects of whom more ought to be known on this side of the water, and who is certainly a much finer painter than Mr. Brownell is a critic. The article on American wood engravers is occupied with the work of Gustave Kruell, "a German by birth, but an American in all that pertains to the growth of his art," a view which the illustrations of his work hardly bear out; there is a tendency towards the grotesque in them which seems to belong to his German descent. A very pleasing portrait of Mr. Hamerton, from the last photograph taken of him, is one of the attractions of a number of very varied interest.

Harper's Magazine includes an article by Mrs. Pennell on "Art in Glasgow," a review of the Glasgow group of painters, which perhaps rather exaggerates their importance as a school (if they are to be so called), though we quite agree with much that is said about the work of some among them as individuals. In the same number Mr. E. L. Weeks has one of his descriptive articles on "Oudeypore, the City of the Sunrise," with a number of charming illustrations of street scenes and palaces.

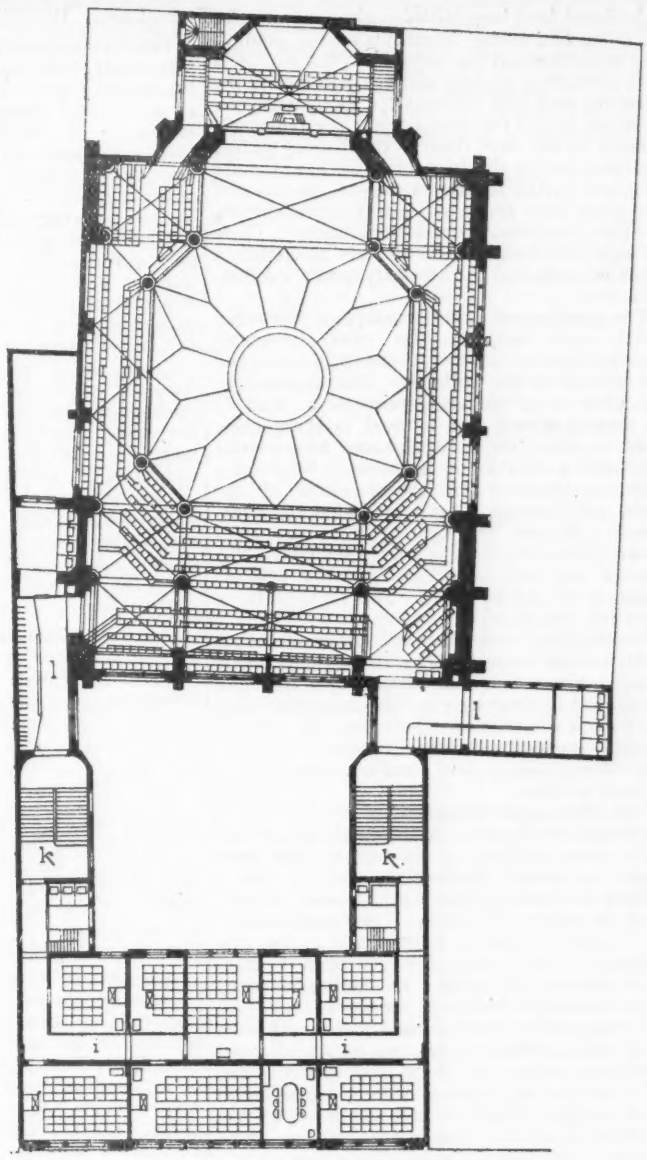
In the *Nineteenth Century* the Hon. Reginald Lister gives an account of the recent work of the French at Delphi, comparing their position and facilities, supported by the liberal subscriptions of their Government, with the discreditable manner in which the British School at Athens is left to do what it can on its own slender resources, without the support of the English Government either in sympathy or in funds.

In the *Pall Mall Magazine* Mr. Walter Besant continues his articles on "Westminster," dealing

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.



GROUND PLAN.



UPPER PLAN.

New Synagogue, Berlin.

A Carriage Entrance.
B Fore-courts.

a Lobby.
b Praying Chapel.
c Marriage Chapel.
d Sanctisimum (adytum).
e Precentor's Room.
f Rabbi's Room.
g Rabbi's House (basement and two floors).
h Beadles' Tenements.
Divinity School.
k Stairs to Divinity School.
l Cloak Rooms.

this month with the subject of "The Vanished Palace" of Whitehall, and giving an account of some of the masques held there in the time of Inigo Jones, and probably schemed and arranged by him. The illustrations include a portrait of Inigo Jones, a view of the river-front of his projected palace, and a reproduction of Fisher's plan of the Palace of Whitehall and its surroundings in the time of Charles II.

Longmans' Magazine contains an article on de Lesseps, by Mr. W. H. Wheeler, which, as far as the history of the Suez Canal is concerned, is both interesting and true, but endeavours to whitewash de Lesseps in regard to the Panama scheme to an extent which it is quite impossible to concur in.

The *English Illustrated* includes a short article by Mr. Edward L. Cutts on "Two Dozen Greek Coins," with illustrations of the coins in question. The article gives a good idea of the historic and artistic interest attaching to such relics.

The *Windsor Magazine* contains an illustrated article on the Ruskin Museum at Sheffield, and a portrait of the sage of Brantwood forms the frontispiece to the number.

The *Album* is a new publication in which the illustrations are the chief attraction, and in which it is intended to group these so as to illustrate special subjects. Thus in the current number the literary portion is devoted to certain matters in connexion with the management of the Houses of Parliament, accompanied by portraits of some leading officials; while the "Supplement" consists of a charming series of portraits of "beautiful children." The coloured wrapper, representing a lady seated with her back to the spectator studying an *affiche* of the *Album*, merits notice as an unusually successful example of chromo-lithography, in regard to colour and texture, being entirely devoid of the crude opposition of colours and hardness of texture too often characteristic of chromo-lithographs.

The *Antiquary* contains an interesting article, by Mr. F. G. Kitton, on "Engravings of St. Albans Abbey," giving an account of old illustrations of the Abbey, with reproductions of some of them.

An article on "Bogus Building" in the *Economic Review*, by "A Practical Builder," draws attention usefully to some forms of jerry-building, but the writer talks libellous nonsense in his remarks about the District Surveyor being "squared" by being employed to make the plans. He ought to know that by the Act a District Surveyor is under the surveillance of another surveyor, appointed by the Council, in regard to buildings executed from his own plans.

[The foregoing notes should have appeared last week, but were unavoidably postponed owing to pressure on our space.]

Illustrations.

DESIGN FOR THE PARIS EXHIBITION OF 1900.

THIS is the bird's-eye view of the design submitted in the recent competition by M. Hénard, architect, of Paris, and one of the three to which the highest premium of 6,000 francs was awarded.

To those who, like most of our readers, know the ground, the design sufficiently explains itself; we may observe that it is one of those in which the Palais de l'Industrie is proposed to be removed and rebuilt on a new axis at right angles to the river, where it is seen in the view, westward of the formal garden formed on the line of the new bridge.

The Eiffel Tower is unfortunately retained in the scheme; apparently also the Galerie des Machines, but the other buildings of the 1889 Exhibition are altered.

As we have already observed, the selection of a design involving the removal of the present Palais de l'Industrie, for one of the three first premiums, seems to imply that this expedient is favourably regarded, and likely to be carried out in whatever plan is finally determined on.

NEW SYNAGOGUE, BERLIN.

CONCURRENTLY with the recent increase in the number of Lutheran churches in Germany, a number of new synagogues have been erected for the different Jewish communities. Messrs. Cremer & Wolffenstein, of Berlin, have become specialists in the work, and are entrusted with most of the commissions. The synagogue we illustrate did much to give them their repute in this respect, and is at the same time a typical example of the treatment given to this class of work by the architects in question. As the drawings kindly put at our disposal would scarcely do justice to the design, we publish some photographs, for which we are indebted to the publishers, Messrs. Wasmuth, of Berlin, who have included the building in a series they are issuing on modern German architecture.

The new synagogue stands in a somewhat unfortunate site in the Linden Strasse, at Berlin. The frontage of the site is about 100 ft., the depth is about 280 ft., and its greatest width is 140 ft. Besides the place of worship, room had

to be found for a large divinity school, a house for the rabbi, and several tenements for the beadles. The usual forecourt was required. The architects have provided a spacious carriage entrance to the forecourt, with side passages for foot-passengers. On either side of the passages are the tenements referred to, and over these is the divinity school. On either side of the forecourt there are separate entrances to the tenements and to the schools. The latter have ample staircase accommodation, and the class-rooms are carefully planned. There are eight class-rooms with 260 seats altogether, a common-room, and the necessary lavatory accommodation.

The arrangement of the actual place of worship will be seen from the plans. There is seating room for 900 men on the ground floor level, and 900 women in the galleries. The approach to the latter is by the same staircases as lead to the divinity school. As is usual in synagogues, there is very ample cloak-room accommodation, and a number of lavatories. Fifty extra seats are provided for the members of the choir, who occupy a gallery behind the altar-screen. Besides the lighting from the sides shown in the plan, there is a large skylight. The span of the vault in which this top light is measures 18 m., or 60 ft. The skylight has a diameter of about 20 ft.

The building has a combined system of hot-air and hot-water heating. The artificial lighting is by incandescent lamps augmented by a system of emergency lighting by gas. Recourse has been had to iron construction where possible, and all modern improvements have been introduced. The building cost 41,000*l.*, and was completed in eighteen months.

The architectural treatment of the exterior is somewhat nondescript, in red brick, picked out with brown or green glazed bricks. The style might be termed Hanoverian, which means a modern adaptation of the North German Romanesque carried out in brick. The façade towards the Linden Strasse is not successful, but the elevation of the main block which faces the forecourt is more interesting. Of the interior treatment our readers can judge for themselves. All the piers, and all portions in which carved ornament could suitably be introduced, are of a red freestone, whilst the large wall-surfaces and soffits of the vaults are in stucco, treated with colour-design. The altar and screen show some excellent bronzework and fine embroidery. The woodwork throughout the building is oak.

Messrs. Cremer & Wolffenstein's commission is the outcome of a limited competition, in which twelve architects participated. Herr Topp was the chief assistant in charge of the work.

A HOUSE IN CLEVELAND.

THIS small house, proposed to be erected on the Yorkshire moors, will be built of local stone ashlar, the roofs being covered with Whitland Abbey slates. Mr. Arthur Edmund Street, M.A., is the architect.

PROPOSED TOWER, DEWSBURY CHURCH.

THE restoration of the lower part of the tower with the addition of new buttresses and a belfry stage, together with the rebuilding of the north aisle, are the only portions of this restoration still remaining to be done, and will be carried out at an early date. The cost of the scheme, when complete, will be upwards of 25,000*l.*

The chancel and transepts were rebuilt some ten years ago, and the restoration of the nave roof and rebuilding of the south aisle are at present proceeding. Holmfirth stone ashlar is being used internally and externally; the roofs are lead-covered and are ceiled with oak panelling. The existing clearstory windows shown in the drawing have been replaced by others of a more suitable character. Messrs. H. Willcock & Co., of Wolverhampton, are the builders for this portion; Mr. Arthur Edmund Street, M.A., being the architect.

HOUSE AT DISLEY.

THIS house is now approaching completion, on a very elevated position overlooking the Cheshire and Derbyshire hills. The outside walls are faced with red Ruabon bricks, with Darley Dale stone quoins and dressings, and the roofs are covered with tiles.

The architect is Mr. John Brooke, of Manchester, and the drawing was exhibited at the last Royal Academy exhibition.

FROEBEL EDUCATIONAL INSTITUTE.

THE scheme initiated about five years ago by Mrs. Salis Schwabe, for the establishment in England of a model institution which should serve as a practical example and illustration of the results to be derived from the application of Froebel's educational methods, has resulted in the erection of a portion of the building shown in one of our illustrations. The centre building, which has just been erected from the design of Mr. John S. Quilter, forms the training college for teachers on the Froebellian method. On either side of this it is proposed to erect kindergarten schools, with covered gardens and open playgrounds. The college provides accommodation for 125 students, and each kindergarten school will provide for 100 children, one of the schools being intended to be free, the other for paying scholars, and it is intended that the system shall not be confined to the infant school, but continued to the higher stages of education in accordance with the principles laid down by Froebel.

The basement of the college contains rooms for a caretaker, students' cloak-room and dining-room, and a class-room for domestic economy. The ground floor is shown in the illustration, and the upper floor has a large assembly-room and two class-rooms. JOHN S. QUILTER.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

The Blackwall Tunnel.—Mr. W. J. Bull, in bringing up an adjourned report of the Bridges Committee, said that the work in connexion with the Blackwall Tunnel had recently been attended with much anxiety. The compressed air had rushed out, causing a waterspout 18 ft. high, but serious consequences had been averted, and since then the work had been proceeding favourably.

Shaftesbury Memorial Fountain.—The Improvements Committee presented a recommendation to the effect that they be authorised to arrange for the drainage of the top step of the Shaftesbury Memorial Fountain by the insertion of an open cast-iron grating at a cost of about 30*l.*

Mr. Turton proposed that the recommendation be referred back for further consideration. He said that the fountain was a hideous and unsightly object, and he should like to know how much longer the Council was to go on tinkering with it at the expense of the ratepayers.

Mr. Roberts seconded the amendment, which was carried.

Combined Drainage.—The Main Drainage Committee brought up a report, of which the following paragraph is part, the recommendation being agreed to:—

"On the 20th of November last we reported to the Council that representations had been made to us by various local authorities on the subject of the law as regards combined drainage, and that they had asked the Council to promote legislation with a view to an alteration in the definitions of the words *drain* and *sewer* in the Metropolis Management Acts. The following extract from our report it may be well to repeat, as it gives a brief statement of how the matter at present stands. 'The present definition of the word *drain* (Sec. 150 of the Act of 1855) is—"any drain of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed;" and also (Sec. 112 of the Act of 1862) "any drain for draining any group or block of houses by a combined operation under the order of any vestry or district board, or pursuant to the order or direction or with the sanction or approval of the Metropolitan Commissioners of Sewers." Old combined drains into which the drainage of more than one house is conducted are *sewers* within the terms of the Metropolis Management Act. These drains were no doubt originally constructed for the accommodation of the particular houses, and in some cases through private land. It is now found that they are defective and wearing out, and their repair and renewal involves considerable expense and difficulty to the ratepayers. It is, therefore, suggested that the meaning of the word *drain* should be extended so as to include any drain the plan of which has not been approved as a sewer under Sec. 69 of the Act of 1855 and Sections 45 and 48 of the Act of 1862. The result would be to transfer from the local authorities the liability under which they now are to maintain and repair these sewers, and to cast it back upon the owner of the property. It is admitted as regards drains hereafter made that no protection is needed, and the suggested legislaion is, therefore, entirely retrospective.' We concluded the report with a recommendation that the Council should not promote the desired legislation, but this was by leave of the Council withdrawn. Since that time we have received a numerous deputation on the subject, representing a large majority of the vestries and district boards. Having heard the deputation, we are of opinion that a grievance exists, and that a heavy responsibility is thrown upon the local authorities to repair combined drains, which, it was pointed out, were laid down for the benefit of the owners of the houses and with the intention, as the deputation contended, that the owners should be held responsible for their maintenance. Having carefully considered the matter, we have come to the conclusion that the Council should, as the central authority, promote legislation in accordance with the views of the local authorities, and we recommend—

'That the Council do apply to Parliament for an amendment of the definition of the words *sewer* and *drain* in the Metropolis Local Management Act in the way desired by the local authorities, and that it be referred to the Parliamentary Committee to prepare a public Bill and take such other steps as may be necessary for that purpose.'"

The Water Question.—The Water Committee brought up a long report containing the following recommendations:—

"(1.) That the Council is of opinion that the scheme for a system of storage reservoirs, presented to the Royal Commission on Water Supply by the water companies, coupled with the proposal to abstract large additional quantities of water from the rivers, is not the proper method of meeting the future wants of London. (2.) That any further capital expenditure on works in the Thames and Lea valleys for the supply of London should be regarded as of a temporary character, and should be restricted to such improvements as may be for the time indispensable. (3.) That the true solution of the problem is the obtaining of the necessary additional supplies from a purer source, and that accordingly the Water Committee be instructed to proceed with the preparation of a scheme to be presented for the consideration of the Council as soon as possible, with a view to an application to Parliament for the necessary powers."

Mr. Bassett Hopkins (Chairman of the Committee) in moving the adoption of the Report, said that after a long and careful consideration of the Staines reservoir scheme, of which the Royal Commission had given a qualified approval, the Committee had come unanimously to the conclusion that that scheme, accompanied as it must be by an enormously increased abstraction of water from the Thames, and by an exceedingly expensive system of checking and supervision, was not the true solution of the problem. The subject-matter of the inquiry of the Commission was only a fragment of the whole question. The Lambeth Company had storage for six days' supply, the West Middlesex for six and a-half, the Grand Junction for three and a-half, and the Southwark and Vauxhall for only one and a half. Yet there was an opinion, tolerably widely entertained, that the storage of water should represent not less than twenty days' supply. The chemist showed that water taken from the companies' mains contained living animals far larger than baccilli, though still microscopically small. It was suggested that the present filters should be improved, but how was that to be done? The Chelsea Company's filter beds were 8 ft. deep, but he knew of one company whose filter-beds were only 3 ft. 6 in. deep. Then how were they to prevent the companies running their water through the filters at an undue velocity? They might make regulations, but it would require an army of inspectors to see that they were carried out. The reservoir scheme was an impracticable one. It would be necessary, if those reservoirs were constructed, to have 500,000,000 gallons of water coming down to Staines, but it constantly happened that they did not have so much coming down to Teddington. Finding the river supply in such a condition, what was to be done? The alternative was the obtaining of a purer supply from a new source.

On the motion of Sir John Lubbock, M.P., the debate was abjourned.

The Council rose at seven o'clock.

LIVERPOOL ENGINEERING SOCIETY.—The usual fortnightly meeting of this Society was held at the Royal Institution, Colquitt-street, on the 6th inst., Professor H. S. Hele Shaw, M. Inst. C.E., President, in the chair, when a paper was read by Mr. Henry H. West, M. Inst. C.E., M. Inst. N.A., entitled "The Principles of Statical Stability in Ships." The discussion upon the paper was adjourned to the meeting on February 20.

COMPETITIONS.

CHURCH, BELFAST.—The competition for a church at Elmwood-avenue, Belfast, has been decided as follows:—1st Premiated design by Mr. Walter Planck, 33, Beauchamp-road, London, S.W.; 2nd. Messrs. Philip Henry Tree, F.R.I.B.A., and Ivor Stuart Price, 70, Warwick-road, Earl's Court, S.W. The assessor was Mr. W. J. Gilliland, architect, Gresham Chambers, Royal-avenue, Belfast.

COTTAGE HOSPITAL, ALDERSHOT.—In this competition the assessor, Mr. W. D. Caröe, 35, Bond-street, London, has issued his report. Ninety-four sets of designs were sent in, and in the opinion of the assessor no high average of skill in hospital planning has been attained, nor has evidence of general knowledge or sufficient study of hospital requirements been shown by the competitors. He has awarded the premium to the design marked with a double circle, No. 40 of those received (Mr. T. Davison, Chelsea), and compliments the author of the design "M.D."

BUSH HILL PARK SCHOOLS.—Mr. Macvicar Anderson, the assessor, has awarded first place in this competition to the design by Mr. G. E. T. Laurence, A.R.I.B.A., 181, Queen Victoria-street, E.C., and the Enfield School Board has adopted his award. The school will accommodate 300 boys and 300 girls. There will be an assembly hall on the ground floor, common to both departments. Twelve architects competed.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—The fifth ordinary meeting of the forty-seventh session of this society was held on Monday in the Law Library, Union-court, Castle-street. Mr. H. Hartley, President, occupied the chair. The paper for the evening was contributed by Mr. Leonard Stokes, of London, who addressed the meeting on "Observation." A great deal of a young architect's work and career, he said, depended upon how and to what extent he fixed his mind or attention upon certain subjects. They might safely say that observation was the principal factor in the training of an architect. The eye should be trained to see things in perspective even though they were only drawn in elevation; and if the eye could not at first be brought to do this the hand might be sworn in, for the habit of thinking, sketching, and seeing things in perspective would be found of the greatest use in designing. Far too much work was thought out only on the flat, and hence when executed was unsatisfactory. Observation was the never-failing remedy, and it was surprising how, after a little of it, the brain and eye became most obedient and expert, and could either think or see round corners with the greatest ease. Young architects should observe how the best men get their effects, and also where they failed, for perhaps one of the greatest uses of observation lay in its teaching what to avoid. Observation must also be carefully applied to the clients, and their little eccentricities studied.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Mr. Axel H. Haig, R.P.E., delivered a lecture, on the 11th inst., to the members of the Leeds and Yorkshire Architectural Society, in the Law Institute, Albion-place, Leeds. Mr. E. J. Dodgshun presided. The subject of the paper was "Wisby and Gotland in the Baltic." The lecturer first dealt with the religion, customs, and legends of Gotland, an island of which Wisby is the principal town. The churches were at first constructed of wood. By-and-by those were replaced by stone buildings, but not a single entirely new church had been erected since 1411. The wall surrounding Wisby was erected during the latter half of the thirteenth century, and was, perhaps, the most remarkable work of its kind. The first wall was in the course of years heightened and thickened, and between the existing towers smaller towers were constructed. The wall was from 20 ft. to 30 ft. high, and the towers from 60 ft. to 70 ft. high. Five of the large towers contained the town gates, which had formerly portcullises and outworks. The wall was 11,200 ft. in extent. In the ancient days that wonderful construction protected fifteen churches, the King's palace, and streets swarming with merchants, soldiers, sailors from all parts, priests, and civilians. That continued till 1361, when the place was taken and plundered by a Danish king. The town revived after that, but the crash came in 1525, when it was stormed, and the northern part burned. Mr. Haig went on to describe the more interesting features of his sketches, principally of churches, which were thrown on the screen. At the conclusion a vote of thanks was accorded to Mr. Haig, on the motion of Mr. Tindall.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The ordinary monthly meeting of members of this Society was held on Tuesday, the President, Mr. E. M. Gibbs, in the chair. Mr. John Holden, F.R.I.B.A., F.S.I., the President of the Manchester Society of Architects, delivered a lecture on "Ancient Lights." He first explained the meaning of the term "ancient lights" and its application in relation to property generally, referring to the first recorded instance known to him of such a question (named in Gibbon's Decline and Fall of the Roman Empire) as occurring A.D. 829. He then explained the mode of dealing with the question up to the passing of the Prescription Act in 1832 (2 and 3 Will. 4, c. 71) which was quoted and explained, and went fully into the various questions connected with the subject in modern practice. A discussion followed, and a request was made that Mr. Holden would allow his paper to be printed.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of this Association took place on the 6th inst. in the Royal Institution, Mr. W. W. Robertson, the President, in the chair. Mr. Percy Fitzgerald, F.S.A., made a communication on "Adam Architecture in London." Having suggested that there were at present symptoms of a revival of interest in the work of this illustrious family of architects, the lecturer proceeded to deal in considerable detail with the architecture of Robert Adam, whom he described as "the flower of the flock," and a man of extraordinary versatility, dramatic power, and ability. His style was inspired by Diocletian's Palace at Spalato, with all the peculiar incidents of which he became permeated. On Adam's return to this country, the lecturer showed how extensive his practice became, giving it as his opinion that no other architect ever enjoyed so large an amount of remunerative work. In London alone it was almost incredible the number of buildings he set up. As to his principles of style, one of the most outstanding features was his marked individuality, Adam putting his stamp on everything he did. His exact sense of proportion, his great care as to the minutest details, and his singularly refined taste in various directions were notable characteristics of the man. Dr. R. Rowand Anderson, in moving a vote of thanks to the lecturer, said there was no doubt that the architecture of Adam was beginning to have its weight in the architectural study of the rising generation of architects, and they were fortunate in Edinburgh in possessing some of his very best examples. The Register House, to his mind, was the finest thing they had in the city. At the same time, he thought the father's work was a much more vigorous type of work than the son's. Professor Baldwin Brown seconded the vote of thanks, which was cordially passed.

EDINBURGH SCHOOL OF ART.—On the 9th inst. Mr. S. Henbest Capper, architect, delivered a public lecture on "Holyrood Abbey," in connexion with the old Edinburgh School of Art, in the Free Assembly Hall. The chair was occupied by Mr. J. R. Findlay, who, in the course of some remarks, expressed regret that the Royal apartments in Holyrood Palace, which had very considerable architectural interest, were not open for public inspection. Mr. Capper explained that he was to deal with Holyrood Abbey as distinct from the Palace, and showed, with the help of limelight illustrations, how fragmentary were the remains of the original building. He afterwards had thrown upon the screen pictures of a number of well-known ecclesiastical buildings in England, with the view of conveying to the audience some idea of the parts of the Abbey Church that have been swept away. In reference to the history of the church, he recalled the legend of King David and the stag, but pointed out that it was not till after the year 1400 that mention came to be made of it in connexion with the foundation of the Abbey. Mr. Capper subsequently spoke of the leading characteristics of the building from an architectural point of view. On the motion of Mr. W. K. Rose a vote of thanks was accorded to Mr. Capper, while the Chairman was also thanked for presiding.

PLYMOUTH SCHOOL OF ART.—In the twelfth lecture, delivered on the 7th inst., at the Plymouth School of Art, Mr. B. Priestley Shires, A.R.I.B.A., dealt mainly with the subject of Early English architecture, and explained the characteristic features of the different kinds of windows and doors, with their ornaments and enrichments. As regards the latter, Mr. Shires said the opening of the thirteenth century saw a new era in ornament, all attempts at Grecian and Roman imitation were given up, the heavy massiveness of the Norman style shaken off, and succeeded by a true English style, with a lightness and peculiarities not to be found even in Continental work. In some cases the carving is very free and graceful, but as a rule there is a spirited stiffness in the forms which is very characteristic and pleasing.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On the 6th inst. a meeting of this Association was held, Mr. E. P. Loftus Brock in the chair, when Dr. Fryer exhibited some photographs of the well-known monument at Igtel, on the Moselle, showing the original base brought to light in recent excavations; he also contributed a paper upon the subject, which was read by Mr. Birch. Mr. R. B. Barrett reported some discoveries he had recently made at the south-east corner of the Palace at Croydon, beneath the ground-level, consisting of Norman masonry having zigzag mouldings, apparently the remains of an arch. This discovery was regarded with particular interest, inasmuch as it is the first recorded instance of Norman work having been found there, all other portions of the existing buildings being of much later date. The chairman alluded to some remains of later date which had been discovered in recent years in the old buildings of Croydon Palace. Dr. Sparrow Simpson next read a paper on the "Head of Simon of Sudbury, Archbishop of Canterbury," and an interesting discussion ensued, in which the author, the chairman, Mr. Prichard, and others took part.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The usual monthly meeting of the Society of Antiquaries of Scotland was held on the 11th inst., Mr. Gilbert Goudie in the chair. The first paper read was a description of a supposed mithraic temple, recently discovered at Wouldham, in Kent, by Mr. James Lang, F.S.A. Scot., of Glasgow. Dr. David Christison, Secretary, gave an account of the forts on the southern slopes of the Lammermoors and the Moorfoots, which are generally distributed along the valleys of the smaller streams falling into the Tweed. Mr. Lockhart Bogle, F.S.A. Scot., gave an account of several Prehistoric structures in Glenelg and Kintail, with ground plans and sketches. In the next paper an account was given of the discovery of a cist, with a cup-and-ring marked cover, in a sand-pit at the Cunningar, Tillicoultry. The cist was of the usual character, but the covering stone was a huge block of granite six feet in length, and sculptured on its upper surface with rings, spirals, and lines. There was exhibited a finely-ornamented urn found near Harvieston Castle, which is now preserved in the Dollar Institution. In the last paper Bishop Dowden called attention to two late notices of the *cultus* of St. Ninian in England.

Books.

Wood-working Machinery; its Rise, Progress, and Construction; with Hints on the Management of Saw-Mills, and the Economical Conversion of Timber. By M. POWIS BALE. Second Edition, with additions. London: Crosby Lockwood & Son.

THE historical matter with which Mr. Bale opens his subject is interesting. It is astonishing how little the form of hand tools has changed from primitive times. "The saws of the Grecian carpenters," we are told, "had a similar form to ours in use at present, as shown by a painting still preserved among the antiquities of Herculaneum. Two genii are represented at the end of a bench; the piece of wood which is to be sawn through is secured by cramps. The saw with which the genii are at work has a perfect resemblance to our frame-saw. It consists of a square frame having in the middle a blade, the teeth of which stand perpendicular to the plane of the frame. The arms in which the blade is fastened have a similar form to those we now use." The author might support this instance of the endurance of primitive forms of tools by many others, notably that of remains of tools used by the constructors of the Pyramids; but this would have taken him out of his province, as the remains of tools found at the Pyramids are of those used for masonry working. The author says, "The circular-saw is said to have originated in Holland in the sixteenth and seventeenth century, but there is nothing to show who was the inventor. One of

the earliest records of its use in this country is contained in the patent specification of Samuel Miller, of Southampton, granted in the year 1777, in which he claims 'an entirely new' machine for more expeditiously sawing all kinds of wood, stone, and ivory, and the saws used are of a circular figure." No doubt Samuel Miller would have been a good deal surprised had he been told that his entirely new invention was at least three thousand years old, for there is unmistakable evidence of the use of the circular-saw for stone-work in a fragment of diorite found in the Pyramids. It may be of interest to add that saws at least 8 ft. long, and some kind of lathe with a mechanical rest, were used in preparing the stone of the Pyramids and fragments of utensils found in them. If these tools were used for stone-working, it is reasonable to suppose they were also applied to the conversion of wood.

Leaving the historical matter we turn to the body of the work, which contains descriptions of the various wood-working machines in most general use, such as saw-benches, frame-saws, planing machines, band-saws, moulding machines, mortising and boring machines, general joiners, dovetailing machines, copying lathes, &c. There are a great many illustrations, both in the shape of folding plates and wood-cuts, incorporated in the text. Many of these have the appearance of having been taken from manufacturers' catalogues. They are well selected and the explanations given are generally sufficient. Beyond this there is not much that need be said in dealing with this second edition, excepting that insufficient effort appears to have been made to bring it up to date; indeed, what may be styled the ancient history department occupies altogether disproportionate space in a book intended for working reference. The chapter on "Motive Power for Driving Wood-working Machinery" is somewhat crude. Automatic expansion slides, controlled by sensitive governor gear, and steam jacketted cylinders, are not always unmixed blessings in a saw-mill, as the author seems to imply; and there are situations in which a condenser may not be a source of economy; moreover, the reciprocating parts of an engine, working in straight lines, necessarily do not move in an opposite direction to rotating counter-weights attached to cranks. The author appears to be unacquainted with the results of modern research in connexion with this subject. One would also gather from Mr. Bale's remarks, that steel as a material for boiler construction had not yet been introduced, for he mentions on two occasions that boiler-plates are made of iron, whilst no reference is made to the more modern material. The eulogy of asbestos as a packing for steam piston-rods would not be endorsed by competent engineers of the present day in face of the superior results obtained with the more modern metallic packings. This chapter, however, like those which precede it, does not bear the appearance of having been brought up to date, and does not justify the year 1894 which appears on the title-page. On reading further we find that there is another chapter on motive machinery at the end of the book; but we allow the above remarks to stand, although the author corrects some of the defects above referred to. The practice here followed of publishing antiquated matter under a modern date, and supplementing it with other chapters on the same subject at the end of the book, is extremely inconvenient, and likely to lead those consulting the work into serious error. At the least the reader should be informed of this misleading scheme of arrangement in the preface. In another chapter near the end of the book the subject of band-saws is continued, the practice being brought up to more recent times than in that section which is in the earlier part of the work. There is nothing, however, in the first chapters on the subject to indicate that it will be continued later on.

Calcareous Cements: Their Nature and Uses, with Some Observations upon Cement Testing. By Gilbert R. Redgrave, Associate of the Institution of Civil Engineers, Telford Gold Medallist, and Officier de la Légion d'Honneur. With diagrams. London: Charles Griffin & Co., Limited. 1895. Pp. xv. and 238; 30 illustrations.

This is a good book with a misleading title. "Calcareous Cements: Their Manufacture and Nature," would have better explained the scope of the work. From the title the reader would expect to learn a great deal about the thousand and one purposes for which cements are used, but the whole question of the "uses" of cements is dismissed in one short chapter of nine pages, entitled "The Composition of Mortar and Concrete." On the other hand, the "manufacture" of Portland cement alone occupies five consecutive chapters, or sixty-one pages, upwards of one-fourth of the whole book. Taking the book as it stands — apart from the title — we can recommend it as a careful and valuable contribution to a large and, in some respects, abstruse subject. The introductory chapter deals briefly with the chemical relations of the most important constituents of limes and cements. Chapters II. and III. are mainly historical, the early numbers of the *Builder* being largely drawn upon. "The Composition of Portland Cement" is discussed in Chapter IV., attention being called to the danger of light ("over-clayed") and heavy ("over-limed") cements, and of excessive quantities of sulphur and magnesia. The manufacture of Portland cement is fully described in Chapters V. to IX., and is illustrated by several drawings of machines, &c., one of the most interesting of which is the Grusonwerk ball-mill for grinding cement. After the short and entirely inadequate chapter on mortar and concrete, the important subject of "Cement Testing" is discussed. The author wisely condemns the *weight* test on account of its uncertainty, and objects, as we have already done,* to the *specific gravity* test as being "too refined for actual practice," and because "it certainly furnishes no guide as to the quality of the material." The test for *tensile strength* is considered at great length, but sufficient stress is not laid on the importance of that test with sand, and in quoting Professor Unwin's formula for the induration of cement from his paper in the *Journal* of the Society of Chemical Industry for 1886, Mr. Redgrave does not make it clear how the values of *b* are obtained, and does not appear to be acquainted with the Professor's later statement of the formula in his book on "The Testing of Materials of Construction." The hot-water test for *soundness* is mentioned, but it is strange that nothing is said of Mr. Henry Faija's part in devising and advocating this test; surely this is not because Mr. Faija is the author of a rival work on Portland cement. No space is devoted to consideration of the adhesive, transverse, and compressive strength of cement, and the importance of fine grinding is not as clearly shown as we expected from Mr. Redgrave. Chapter XII. deals with the chemical analysis of Portland cement, and is followed by chapters treating, *inter alia*, of slag cements, selenitic and plaster cements. The concluding chapter is devoted to "Specifications for Portland cement, but contains nothing new, the author somewhat lamely concluding with the words "We hesitate, with all these differences of opinion, to give our own views as to a model specification. We can only hope that unanimity may ere long be established, and that the adoption of a uniform system of testing may lead to the use of a standard form of specification."

Nothwithstanding the limitations to which we have alluded, the book covers a wide field; it is evidently based on diligent research and practical experience. It is clearly written, accurate (as far as we have tested it), and well illustrated, and contains an excellent index. If another edition be required (and we think it will be), we hope that Mr. Redgrave will expunge or alter the sentence in the preface, in which he says "I have appended a full translation of the German rules for testing, which, I think, have not previously been published in this country"; seeing that a full translation of these *rules* (although not of the instructions and explanations accompanying them) appeared in our columns on November 1, 1890, having been kindly sent to us by Mr. H. A. Roechling, of Leicester.

Electric Light and Power. By Arthur F. Guy. London: Biggs & Co. 1894.

From the author's preface it seems that his aim has been to write a book that shall give only "useful practical knowledge." Some books, he says, are "mathematical, some school text-books, some theoretical." This book, then, is intended for those who have not studied in the schools, who have little or no knowledge of mathematics, and who desire no acquaintance with abstract theory save that absolutely necessary for "useful practical knowledge."

Hateful as mathematics and theory may be to the intended readers of this book, they must have no such distaste for prose poetry when such matter, for instance, as the power of the tides is discussed. "Twice daily do the billows surge and thunder on the shore, and it is only when one gazes, fascinated, at the wide glittering expanse of seething waters as they hurl themselves on a rock-bound coast," . . . &c. "Truly the foam-flakes, the expressive token of all this energy, possess as much value as if they were solid flakes of silver," . . . &c. The practical man may be puzzled not a little at this bathos, but he will be more puzzled when he gets to the "absolutely requisite theory," more especially if he has ever looked into the despised "school text-book." The authors of recognised school text-books accept, just as Lord Kelvin, Professor Taite and such men always do, Newton's laws of motion, but Mr. Guy will follow no such leader. He tells us that when a mass of lead falls to the earth, "the force the lead exerts is comparatively nothing to the force the earth exerts." The absurd fallacy involved in the denial of the third law of motion may escape most readers, and thus do no great barm, but the same indulgence cannot be extended to definitions of the common units. The author is grieved to think "how barbarous and ridiculous our units of measurement are;" the following is an example of how he proceeds to put things right:—*The Unit of Force* is named the "dyne," and it is "that amount of force which, acting for one second, when applied to a mass of one gramme weight, will move it through a distance of one centimètre in one second of time." These two examples are sufficient to show that Mr. Guy is ignorant of the most elementary principles of dynamics.

A writer may not appreciate Newton's laws, nor be capable of making a deduction from them, but at least he could copy an orthodox definition of the dyne, and not define a force which is two dynes if it is anything. If it is absolutely necessary that a working engineer shall know, say, the distinction between mass and weight, which Mr. Guy does not, such books as this should pass through the hands of a capable editor; if it is not necessary, why cumber the pages with immaterial rubbish?

Of the general scope of the book no more need be said than that it is the same as that of most octavo volumes dealing with the subject. The first chapter is on the evolution of electrical engineering, the sixth and last on the distribution of electric power.

In the earlier portions of the work we get examples of prose poetry, but the information given about secondary cells is a yet finer example of the laconic style of writing. The following is *all* it seems necessary for a practical man to know about storage: "Shunt dynamos are always used when possible for charging secondary batteries."

* See the *Builder* for August 20, 1892, &c.

Correspondence.

To the Editor of The Builder.

DISTRICT COUNCILS AND NEW BUILDINGS.

Sir,—It is very difficult to fix an argument on the Clerk to the Wimbledon District Council. When his Board is charged with allowing a building to be erected in violation of their own by-laws, he says the Board cannot interfere because the building is an addition to an old building, older than the by-laws. When pushed into a corner by the reply that if that is so, anyone possessing an old cottage may tack a mansion on to it without regarding the by-laws, he slips away, saying, "No; in each case the Board has to decide upon a question of fact whether the building is exempt or no, and it would not sanction so extreme a case as that suggested." He therefore admits, in spite of himself, that the Board has after all a discretionary power of intervention. When further pressed to say where the line of intervention is drawn he declines to answer. Let us then test their discretion by the case out of which this correspondence arose. The plan you were good enough to publish shows that the builder could not well have gone farther in infringing the conditions of open spaces; he has all but covered with his new building the whole area which the by-laws would keep open. Here, surely, is an extreme case calling for the exercise of that discretionary power of which we are told, and the Board had an unusual motive for caution in the fact that the builder and owner of the intruded structure was its own Chairman. And what happened? The Board not only refused to interfere, but actually examined the plans and sanctioned them. The Board, therefore, is in this dilemma—either they have a discretionary power of intervention and declined

to use it in a gross case such as this, or they have no power of interfering at all in the case of any addition, even of a mansion, to any building, however insignificant, provided it is older than the Public Health Act.

The Clerk to the Wimbledon Council concludes by suggesting that a private individual can take out a summons against a builder under the by-laws if he is dissatisfied with the inaction of the local authority. Perhaps he may. But if he is to be driven to that, what, I would ask, is the use of the local authority and the by-laws which it is elected to enforce for the protection of the district? It is the popular belief, not always perhaps well-founded, that local authorities exist for no other purpose than to administer fairly and impartially those regulations which have been approved as necessary and convenient for public health and individual security.

THOS. G. JACKSON.

PROFESSIONAL ADVERTISING.

SIR,—I believe I have a grievance in common with every payer of guineas to the Royal Institute of British Architects We hear on all sides, and from various quarters, of the desirability of raising the status of the profession in the eyes of the public to its true position amongst the callings of men, and from no quarter do we hear this more (or more appropriately, as must be admitted) than from the Institute itself—whose very existence has surely the furtherance of this end as one of its chief aims.

We look to the Institute to protect us from the tradesman spirit; and some of us look *on* the Institute (not always with sympathy) as the embodiment of the Professional spirit; yet, let anyone take a walk past the front of the Middlesex Hospital, and he will see on a building in course of construction in its vicinity, an evidence of how vain is the trust we repose in our representative body. For there is to be seen, painted on a huge advertisement board, the name of the architect of the building, in letters full 6 in. deep, with all his titles and degrees, and that without any such excusing prefix as "Apply to—&c." It is a simple, straightforward, honest, unblushing, unprofessional advertisement. What impression are such things calculated to make upon the public mind as to the status of the architect?—what of the Institute which seems to lend its sanction with the fine letters F.R.I.B.A. so plainly to be read upon the board? What, moreover, can we hope for from the Institute itself when we recognise the name of which I am speaking as that of *a member of the Council?*

If architects recognise any such thing as "professional etiquette," are we to believe that the Council of the Institute does not regard such an advertisement as a grave breach of it? If so, surely one of the greatest advantages held out as an inducement to membership of the Institute does not exist. It would be interesting to know whether the advocates of the examination are able to reconcile an examination in professional practice with such an example in professional conduct.

It is just as if (to borrow the simile of a fellow-sufferer in this grievance) one were to see in a street laid with the straw which betokens a serious illness, a board affixed to the area-railings (say) of a house, bearing the legend—"The case within is under the care of Sir Stephen Stethoscope, M.D., F.R.C.P." Ought not the Royal Institute of British Architects to do as the Royal College of Physicians would in such a case? I enclose my card, and beg to sign myself "A.R.I.B.A."

*** It may be that in this and some other cases the architect's name has been put up by a company owning the buildings, and not by himself or at his instigation. But the matter wants explanation.—ED

RAIN AND WIND ON BUILDINGS.

SIR,—I note in your leader of the 2nd inst. Mr. Irminger's experiments for ascertaining the "Wind Pressure on Buildings," and I should be glad to know if you or any of your readers are cognisant of the results of any experiments for arriving at the effect of the weight of heavy rain storms impinging on structures in addition to the wind pressure.

"EPIMETHEUS."

BATH SERVICES.

SIR,—At 8 a.m. to-day my bath service was in perfect order. At 10 a.m. the hot water ceased to flow. Investigation proved that the pipes were not frozen, as the ball-cock, cold cistern, and pipe from latter to back boiler were all full and working normally. The exhaust was clear, as was proved by pouring hot water down same into the cylinder. The cold bath cock delivered hot water, which would have been explainable if the exhaust were stopped; but it was not. At 5 p.m. the whole service was in its normal condition again. The kitchen fire was out for some hours during the disarrangement. What prevented the water flowing through the hot cock, and what enabled it to do so after some hours' cessation? PUZZLED.

February 6, 1895.

The Student's Column.

BRICKS AND TERRA-COTTA.—VII.

THE CHEMICAL COMPOSITION OF CLAYS.

WE are now in a position to enquire into the chemical composition of the raw earths themselves. If the student attentively regards the analyses of the commoner minerals found in clays, &c., as given in our last article, he will not have much difficulty in arriving at the mode in which the various chemical constituents occur. Let us consider a simple case by discussing the chemical composition of purer clays, such as are used in the manufacture of porcelain, pottery, and to some extent bricks also.

Chemical Composition of China-clays.

	Silica.	Alumina.	Oxide of Iron.	Lime.	Magnesia.	Water.
1. Best Kaolin	46·32	39·74	·27	·36	·44	12·67
2. Coarse china-clay	66·68	26·08	1·26	·84	trace	5·14
3. Average Kaolin	44·60	44·30	·20	1·60		8·74
4. Pipe-clay	53·66	32·00	1·35	·40	trace	12·08

Sample No. 1 contained also a small percentage of potash and soda, included under water; it refers to the finest washed Cornish china-clay. Nevertheless, it has minute proportions of iron, lime, and magnesia, and it may be taken for granted that kaolin, as used in the arts and manufactures, is almost always mixed with these or similar impurities. Taking the silica and alumina together, it would appear as though very little free quartz (if any) was present. Comparing the felspars with this analysis, we at once observe that anorthite nearest approaches it, and we have noticed that mineral in many Cornish granites. But it is quite clear, from an inspection, that the principal felspar concerned is the orthoclase, which occurs in large white crystals. In decomposing, the rock gets rid of the potash in solution, and a fair proportion of the silica disappears in like manner, though much of the latter constituent also provides the substance of which free quartz crystals found in kaolin are formed. The small proportion of iron most likely came from the orthoclase, and the lime from muscovite mica or oligoclase. The presence of magnesia, seeing that no boracic acid is notified, no doubt is due to orthoclase, in which it often sparingly occurs, or to the mica. The water simply represents hydration.

Sample No. 2—coarse china clay—is rather sandy in nature, from which it may be inferred that much free quartz is present, and this is, to some extent, confirmed by the small percentage of water.

Sample No. 3—average kaolin—will be understood from what has been said concerning No. 1.

Sample No. 4—pipe-clay—containing a rather high proportion of iron, from felspar.

*Chemical Composition of Fire-Clays.**

	Silica.	Alumina.	Iron oxide.	Lime.	Magnesia.	Water, &c.
5. Newcastle-on-Tyne	51·10	31·35	4·63	1·46	1·54	10·47
6. ,, ,,	47·55	29·50	9·13	1·34	0·71	12·01
7. ,, ,,	48·55	30·25	4·06	1·66	1·91	10·67
8. ,, ,,	51·11	30·40	4·91	1·76	trace	12·29
9. ,, ,,	71·28	17·75	2·43		2·30	6·94
10. ,, ,,	83·29	8·10	1·88		2·99	3·64
11. ,, ,,	69·25	17·90	2·97	1·30		7·58
12. Stourbridge (Brierly Hill)	51·80	30·40	4·14	—	·50	13·11
13. Stourbridge	64·10	23·15	1·85	— Soda	·95	10·00
14. Welsh	50·35	23·50	10·40	1·55	1·45	11·85
15. ,,	56·90	24·90	2·83	3·00	1·07	11·60
16. ,,	54·80	27·60	2·56	2·00 Lime	1·00	11·80
17. Glasgow	65·20	33·41	·49	·32	·13	·45

Comparing samples 5 to 11, we may say that they refer to fire-clays taken from a series of seven seams all worked in the mines belonging to one maker, situated a few miles west of Newcastle. These layers lie beneath the coal seams and vary in thickness from 1 ft. to 6 ft. The clay is in most abundance, and in best quality, beneath the coal used for coking and manufacturing purposes. It will be seen that the samples vary greatly in composition, the alumina in one being only 8·10, whilst in another it reaches as high as 31·35. All these clays contain a certain amount of sand, and sample No. 10 evidently has an abnormal quantity. The refractory character of any sample of fire-clay is determined by the proportions in which the silica and alumina are contained, and by the absence of lime, iron, and other easily fluxable substances; but we shall have more to say respecting this in speaking of burning and fusibility. Sample No. 6 contains a very high percentage of iron, and the magnesia seems also to be variable, whilst lime is fairly constant. The iron in these cases is, no doubt, largely due to subsequent filtration, and is, therefore, difficult to trace to its original source. Under the microscope we find in a sample from near Newcastle, that much limonite and a little magnetite was present, as well as some biotite mica. The magnesia most probably came from the last-mentioned mineral. It is noteworthy that magnesia is most abundant in the sample containing the greatest proportion of silica, and from the circumstance that only 3·64 of water was found, one is led to suppose that sample No. 10 was chiefly made up of quartzose grains and other matter derived, without much modification, from the destruction of igneous rocks. It is the common practice of fire-brick manufacturers in the north of England to mix divers clays together in proportions suitable for the production of certain classes of goods.

With reference to samples 12 and 13, from Stourbridge, in Worcestershire, it will be noticed that one contains very much more iron than the other, and that, unlike those from Newcastle-on-Tyne, no lime is present.

The Welsh samples, 14 to 16, are remarkable as containing a large proportion of soda, from which it might be surmised that the material was mainly derived from rocks containing oligoclase. No. 14 has more iron than should be possessed by a good fire-clay, and of the three it is by far the worst. No. 15 is stated to give fair results, but No. 16 may be regarded as excellent. The absence of lime is somewhat peculiar.

The sample from Glasgow, No. 17, has an excess of alumina, and it will be noticed that the clay was deprived of water prior to the analysis being made; the ·45 mentioned is recorded as phosphates.

* Samples 5-11 given on the authority of Mr. J. Cowen, "Industrial Resources of the Tyne, Wear, and Tees" (1864), p. 203; samples 12, 14, 15, 16, "Ure's Dictionary"; sample 13, Dobson, "Bricks and Tiles," 9th ed. (1893), p. 13; sample 17, Ansted, "Applications of Geology" (1865), p. 115.

Chemical Composition of Pottery Clays.

	Silica.	Alumina.	Lime.	Magnesia.	Iron Oxide.	Water, &c.
18. Saggers Clay	66·16	22·54	1·42	trace	5·31	4·52
19. Yellow Clay	58·07	27·38	·50	trace	3·30	10·30
20. Brown Clay	49·44	34·26	1·48	1·94	7·74	5·14
21. Blue Clay	46·38	38·04	1·20	trace	1·04	13·57

These analyses are given on the authority of Professor Ansted. They refer to clays possessing much greater plasticity than the fire-clays just described. Sample No. 18 is a variety used in the potteries for making *saggers*, and it has been adopted also in the manufacture of crucibles for glass works. It has less alumina than the others mentioned, whilst there is a large proportion of silica. The yellow clay, No. 19, has more alumina and less lime, and its colour is unquestionably due to the presence of so much iron, possibly the peroxide. It is used in the manufacture of coarse ware, and burns yellow. Of No. 20 we note that alumina is increased at the expense of silica, that lime is rather abundant, whilst it has a larger proportion of iron—hence its brown tint—and as much as 1·94 of magnesia. This is a very common species of pottery clay, used only for black and inferior red ware. As might be readily anticipated from its chemical composition, it will not bear exposure to great heat. The blue clay, No. 21, is the best material for pottery, and burns white. It has but little iron, and must be very plastic; some improvement would be effected by a slight proportion of the alumina being transferred to silica, otherwise this is an excellent average material from a chemical point of view. It need hardly be remarked that an enormous number of bricks are made from clays of this class, by the addition of suitable ingredients to assist in agglutination.

Chemical Composition of Brick-earths.

	Silica.	Alumina and Iron.	Lime.	Magnesia.	Water, &c.
22. "Red brick" clay	50·40	24·00	2·70	1·30	21·60
23. Brick-earth	33·06	11·20	39·80	6·00	10·00

No good purpose would be served by giving several analyses of brick-earths at the present stage; they vary to such a wide extent, according to their locality and position, and produce such divers results when burned, that it is hardly possible to speak of them in a general way. We, therefore, thought it would be useful to give one analysis referring to a superior brick-earth, No. 22, such as is used in the manufacture of good sound bricks, and another analysis appertaining to a brick-earth of the worst possible description, No. 23. The excessive hydration of the former, of course, marks it as being specially suitable on account of its plasticity for the rapid moulding of bricks; it does not contain much lime or magnesia; and although the analysis is not as explicit as might be, the clay evidently possesses but little iron also. The small quantity of alumina, as compared with some of the other analyses given, is noteworthy. On the other hand, it is not difficult to see that the inferior brick-earth, No. 23, has too much lime and magnesia: indeed, it should be characterised as marl. Both the last-mentioned ingredients occur as carbonates, which aggravate the case; naturally, it effervesces with acid, and has a tendency to decrepitate locally when subjected to great heat. It was, no doubt, largely derived from the disintegration of limestone.

We do not think it worth while to go into details concerning the chemical nature of slates, or *débris* from slate quarries, so far as these are used for brickmaking, but it may be remarked that in general they resemble the more impure kinds of clay, with a low percentage of iron, lime, and magnesia, and but very little water. When not easily cleavable the slaty material frequently contains much sand, with large proportions of silica.

In the foregoing observations dealing with the mineral and chemical composition of brick-earths we have not alluded to those clay substances such as are immediately derived from the disintegration of volcanic rocks. These are more interesting to the student of Continental bricks and brick-making than to readers in this country, and all we need say is, that where the clays are obtained by the weathering of acid volcanic rocks—those which contain a considerable amount of silica—the products are generally good; whilst where basic rocks have furnished the material there is liable to be an excess of lime, soda, magnesia, and iron.

In the vale of Neath, Glamorganshire, is a highly siliceous earth, known locally as "Dinas clay," of which the celebrated Dinas fire-bricks are made. The proportion of silica ranges from about 96 to 99 per cent., and it may be mentioned that in the preparation of the material some flux—usually lime—has to be added. The remainder consists principally of alumina, but traces of iron, lime, and magnesia are usually present. Ganister, or Gannister, is a name employed to denote a hard siliceous bed, constituting the floor of some of the Durham and Yorkshire coal-seams. In certain parts of the Continent "infusorial earth" is employed in the manufacture of bricks for specific purposes; they are often so light as to be able to float in water. An analysis of one such earth, found in Tuscany, gave—siliceous earth 55, magnesia 15, water 14, alumina 12, lime 3, and iron 1 per cent. Similar earths have been discovered near Clermont, in the Auvergne, in Poland, and elsewhere.

OBITUARY.

ALDERMAN J. HATCH.—Alderman James Hatch died on the 11th inst. at Lancaster. Deceased was in his seventy-seventh year, had served on the Town Council twenty-eight years, and was Chairman of the Gas Committee many years. He was a builder by trade, and was the head of the firm of Hatch & Sons.

GENERAL BUILDING NEWS.

NEW BANK PREMISES, EASTBOURNE.—Messrs. Molineux, Whitfield, & Co. (Lewes Old Bank) are erecting new premises at Eastbourne, from the designs of Messrs. Mitchell & Ford, architects, of Eastbourne. The style adopted is Italian Renaissance, the ground floor being treated as a base, with panelled piers and plinth, to the first and second floors, which have engaged fluted Corinthian columns and pilasters, extending the height of both stories, surmounted by entablature with pediments. A dome, covered with Braby & Co.'s metallic tiles, is introduced as a central feature. The entrance to the building is in the centre of the ground floor, which contains public office 35 ft. by 20 ft., clerks' office 27 ft. by 18 ft., manager's and partners' private offices, book-safe, and lavatory accommodation. The strong-room is in the basement. On the first floor are arranged various suites of offices, with separate entrance in Terminus-road, and also the manager's reception-rooms. On the second floor are the manager's sleeping apartments. The residential part has a separate entrance in Junction-road. The building is to be faced with Bath stone, the cornices and principal projections being of Portland stone. The roof will be covered with Westmoreland green slates. The internal fittings of bank, screens, dados, &c., are in polished mahogany. Electric light is to be fitted throughout the building. The whole of the plastered work is finished in Keene's cement. The building will be completed in about twelve months. The floors are to be fireproof, by Messrs. Mark Fawcett & Co. The builder is Mr. M. Martin.

RENOVATION OF DALSERF CHURCH, LANARKSHIRE.—Reopening services have just been held at this church after the renovation of the interior, and the rebuilding and extending the north aisle, re-seating the whole area over a layer of concrete, and providing new heating and ventilating apparatus. The church was built in 1655, and its plain outside appearances has not been interfered with. The old-fashioned outside stairs to the galleries are one of its features. The mason work is by Martin & Symington, the joiner work by Pettigrew & Co., plumber work, J. Hislop, all of Carluke; the slater and plasterer, Mr. M'Ghie, Hamilton; and the heating by Combe & Son, of Glasgow. Messrs. Hay & Henderson, of Edinburgh, were the architects.

CHURCH, KETTERING.—A new church has just been erected at Kettering, at a cost of about 7,000*l*. The architects were Messrs. Gotch & Saunders, of Kettering, and the structure is built both inside and out mainly of local sandstone, relieved with dressings of Weldon stone. The nave and aisles are 93 ft. by 44 ft., and the chancel 40 ft. by 25 ft. There is a narrow aisle on either side of the nave by which the seats are approached. The whole of the seating is in the nave. The baptistry is a projection at the west end, and there is a large vestry for the choir, and a vestry for the clergy. A space is left for an organ on the south side of the chancel. The church is entered by porches with double doors, at the west end. The style of the fabric is Late Gothic. The roof of the nave is supported by buttresses. The building is lighted by a long clearstory, the whole length of the nave on both sides, and by large east and west windows. The roof is of steep pitch, tiled with Broseley tiles, and near the middle will be a tall fleche. The church is heated and ventilated by Messrs. Ashwell & Nisbett, of Leicester. Mr. G. Henson, of Wellingborough, was the builder.

RESTORATION OF CHRIST CHURCH, SOWERBY BRIDGE.—Christ Church, Sowerby Bridge, which was partially destroyed by fire a year ago, has just been re-opened after restoration. The nave is now spanned by a new roof, of a higher pitch than the former one, consisting of open tracery work, the panels being moulded-ribbed, and the boarding all of pitch-pine. The span of the nave is 52 ft. The new chancel-roof is similar in character. One improvement in connexion with the re-arrangements has been the opening out by complete arches, fitted with ornamental oak-work, of the organ-chamber into the nave, this having been entirely walled-up in the old church. The gallery front in the old church was of an out-of-date character, but the new one is lower. At the time of the fire a large portion of the west-end, under the gallery, was sealed off to form a kind of vestibule or anti-church. This space has now been thrown into the nave, and utilised for additional seating accommodation. The staircase formerly in the tower has been abolished, and the space is now occupied by the choir-vestry. A new clergy-vestry has been added to the building on the north side. Hitherto the access to the gallery was confined to one doorway abutting on to a winding staircase, but the place of this is now taken by two staircases of stone on the north and south sides of the tower. The old heating apparatus is now entirely replaced by a new system, hot water at low pressure being used for that purpose. The stained glass windows damaged by the fire have all been reinstated, and a new stained glass window by J. Edmondson, Manchester, has also been placed at the south end of the nave, under the gallery. The flagged flooring is now superseded by ornamental red tiles. The new pulpit of white Bath stone has been built by Messrs. J. Charnock & Son according to the designs and models of Mr. W. Clement Williams, of Halifax. The following firms have been the principal contractors:—Masons, J. Turner & Sons, Warley; joiners, J. Charnock & Sons, Halifax; plumber, T. Boocock, Halifax; slater, T. Dyson, Sowerby Bridge; painter, Mrs. Mallinson, Sowerby Bridge; tiling, Maw & Son, Stoke-on-Trent; gas chandeliers, Stott & Son, Oldham. The total outlay is estimated at 5,000*l*. The architects were Messrs. Horsfall & Williams, of Halifax.

FOREIGN AND COLONIAL.

FRANCE.—The first stone of a new Hôtel de Ville at Ivry has been laid. The architect is M. Adrien Chancel, who obtained the commission as the result of a competition. The building, which will cost 800,000 francs, will be erected in what was formerly the park of Hardouin Mansard the architect.—At Saïgon, in Cochin China, a competition has been opened for a theatre, to cost 700 000 francs.—M. Coulon, the sculptor, has completed the statue of Théodore de Banville, intended for the poet's native town, Moulins. The work, which is to figure in the next Salon, represents the poet seated in an armchair and draped with a long robe like a dressing-gown.——In accordance with a recommendation of the Commission des Monuments Historiques, various repairs are shortly to be undertaken to the Maison Carrée, at Nimes, the interior of which is to be repaved, ornamented with mosaics, and is to receive the collection of ancient coins at present deposited at the Mairie.——The Champ de Mars Salon will be open this year from April 25 to June 30.——There is talk of erecting in the Rue Bonaparte, near the École des Beaux-Arts, a home for the Académie of Médecine, at present very inconveniently installed in the Rue des Saints Pères.——The Minister of Public Instruction and Fine Art has commissioned M. Achille Jacquet, engraver, to produce a portrait of the new President of the Republic, M. Faure, while M. Chaplain has been commissioned to execute his bust as a medallion, and M. Saint-Marceaux to produce it in sculpture.——The jury in the competition for erecting a monument to Watteau in the garden of the Luxembourg, has decided in favour of the design by M. Henri Gauquié (sculptor) and M. Guillaume (architect). On the centre of a balustrade forming a semi-circle is a column bearing the bust of Watteau. A young woman in the costume of the eighteenth century, seated on the balustrade, offers a bouquet of flowers to the painter. The monument as a whole will have a very good decorative effect.——The death is announced of M. Sidney Dunnett, member of the Société Centrale des Architectes, and architect-in-chief to the Nord Railway Company, who received last year the decoration of the Legion of Honour for his excellent works at the railway-stations of Lille, Roubaix, and Paris.——We have to record the death of M. Eugène Fichel, the painter, at the age of sixty-nine. He entered at a very early age into the atelier of Delaroche, and commenced his career as a historical painter, but soon abandoned this for *genre* subjects, in which he was very successful, and received frequent medals at the annual Salons. He exhibited regularly up to last year. Among his best works are "Cabaret de Ramponneau," "Partie des Cartes," "Diderot et le Neveu de Rameau," "Le Forge de Louis XVI.," &c. Madame Fichel, his widow, has also been a frequent exhibitor under the name of "Jeanne Samson."

MISCELLANEOUS.

NEW BOLT FOR STABLE DOORS.—This is a variation of the Paragon bolt for special application to stable doors. Two locking-plates are used; the larger of these is fixed on the outside of the door (fig. 1), and the smaller on the inside, but in an

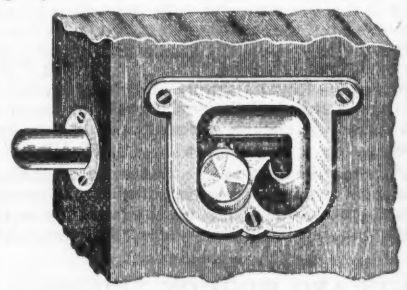


FIG. 1.

inverted position (fig. 2). The handles of the bolt engage both locking-plates, and as the handle on the outside of the door is heavier than that on the inner side, the natural tendency is to throw the

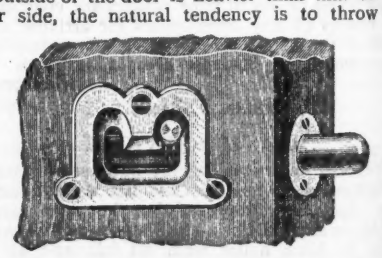


FIG. 2.

handles into the locking-slots. The bolt is so arranged that no daylight is visible through the door where it is fixed, and the fact of the handles of the bolt being flush prevents the horse from using his teeth, and the effect of using his tongue would be to push the handles more firmly into the locking-slots, while there is no projection to catch in the harness or whereby he could damage his skin in rubbing against the door. The bolt is made both

in iron and brass, so as to be suited for all, including the best, classes of stable-work. The Paragon Bolt Syndicate are the makers and patentees.

COMPO-BOARD.—Compo-board is the name given to a new description of lining for buildings which has been brought out in the United States, and a description of which appears in the *Building and Engineering Journal*. It is, as its name implies, a composite material, being made from thin strips of wood placed between two sheets of heavy straw-board. An ordinary cement is used for uniting the parts, and the whole is subjected to heavy pressure. It is said to be wonderfully strong and elastic, so much so that an 18 ft. board can be bent round until its ends touch. It forms a cleaner, warmer, and drier wall than is obtained by plaster; it adds to the strength of the structure, is air-tight and damp-proof, and, finally, is not more expensive when in position than good plastering.

GAS *v.* ELECTRICITY.—In Copenhagen an experiment has been carried out for lighting the streets with incandescent gas on the Auer principle, but there appears to be the commercial difficulty of gauging the quantity used. Automatic meters have been tried without success. On the other hand, the Municipal Central Electric Lighting Station is extending its operation so rapidly that it is expected, by the end of the present year, that the full original capacity of the plant, which is 27,000 lamps, will have been reached. Additions to the station are already in contemplation.

BATH MASTER BUILDERS' ASSOCIATION.—The annual dinner of the Bath Master Builders' Association was held on the 4th inst., under the presidency of Mr. Stephen Ambrose. "The Trade and Commerce of Bath" was proposed by Mr. George H. Perrin, of Bristol, and responded to by Mr. Turner. The toast of "The Bath Master Builders' Association" was proposed by Mr. H. J. Spear, and acknowledged by the President. Mr. G. Humphries and Mr. E. T. Hatherly replied to "Kindred Associations," and Mr. Bligh Bond responded on behalf of the visitors.

REREDOS, ST. MARY'S CHURCH, RYE, KENT.—A new reredos in memory of the late vicar, the Rev. D. T. Gladstone, was dedicated at the parish church of St. Mary, Rye, on the 5th inst. The reredos is constructed of English oak, and has been designed by Mr. Parsons, architect. It consists in the main of three distinct gabled panels resting upon a broad super altar. The panels themselves each contain a sculptured figure. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

PARTNERSHIP.—Mr. R. C. Whitelegg, architect, of Manchester, has taken into partnership Mr. R. E. Whittaker. They will practise conjointly at Mr. Whitelegg's present address in Albert-square, Manchester.

SANITARY INSPECTORSHIP.—Mr. W. L. Bradley, Sanitary Inspector to the Guildford Corporation, has been appointed to a similar position under the Tonbridge Urban District Council.

WINDOW, ST. PANCRAS' CHURCH, EXETER.—This church, one of the oldest in Exeter, recently restored by Mr. J. L. Pearson, R.A., has just been enriched by the insertion of stained glass in the east window. The glass depicts Our Lord, in the centre-light, crucified, with a pelican on the summit of the cross, and a fruitful vine springing at its feet. The two side-lights consist of figures of the boy St. Pancras, and St. Boniface in episcopal garb, standing in Early canopied niches. The work was designed and executed by Percy Bacon, & Bros., of London, under the supervision of Mr. Pearson.

LEGAL.

A BUILDING-OWNER AND HIS PLANS.

THE case of Park *v.* the Fulwood Local Board came before Justice Wills and Wright, sitting as a Divisional Court of Queen's Bench on the 7th inst., it being an application, on the part of a building-owner for a *mandamus* to approve plans he had submitted for a building on his land. He stated in his affidavit that in 1887, being desirous of laying out a building estate, consisting of a row of houses in a line, with gardens in front, he had submitted the plans to the Local Board showing that none were to be nearer than 21 ft. to the pavement. He had then sold two plots, inserting a covenant in the deeds that the purchasers should not bring their houses nearer than 21 ft. to the pavement, but they put their houses further back in order to allow of a greater space for a garden in front. Before he sold the two plots the applicant had sold a portion to the left of the plots, and the purchaser proposed to build a small house upon that plot of land, coming up to 21 ft. of the building-line, and the applicant had sent plans to the Local Board, who had refused to approve of them on the ground that they did not conform to the line formed by the two purchasers who had put their houses further back.

The Court granted a rule *nisi*.

Mr. Banks appeared in support of the rule.

RE WASSON & FAWELL *v.* PAWSON & LEAFS, LIMITED.

THIS motion came before Mr. Justice North recently to obtain an injunction to restrain the defendants from erecting a building having frontages in Carter Lane and Dean's Court, which, it was alleged, would interfere with the light and air of a window and fan-light on the ground-floor, and a window on the first floor of plaintiff's premises, No. 4, St. Paul's Churchyard. It was contended that the obstruction was too far distant, being 80 ft. to 90 ft. away, the building rising 19 ft. 3 in. in one part, and 42 ft. higher than the old buildings in another position.

Counsel for the plaintiffs were Mr. Swinfen Eady, Q.C., and Mr. W. F. Hamilton, instructed by Messrs. White & Leonard.

Counsel for the defendants were Mr. Cozens-Hardy, Q.C., and Mr. Ford, instructed by Messrs. Phelps, Sedgwick, & Biddle.

The surveyors engaged for the defendants were Mr. E. A. Gruning, Mr. H. H. Collins, Mr. F. Chambers, of Messrs. Chambers & Son; Mr. Herbert Ford, Mr. Hudson, of Messrs. Hudson & Booth; and Mr. Robert Vigers. The surveyors for the plaintiffs were Professor Banister Fletcher and Mr. J. Douglass Matthews.

Injunction granted with costs.

A DISTRICT SURVEYOR AND HIS FEES.—IMPORTANT POINT.

MR. MORTON SMITH on the 12th inst., moved in a Divisional Court of Queen's Bench, composed of Justices Wills and Wright, on behalf of the District Surveyor of West Hackney for a rule in the nature of a mandamus to Mr. Lane, the Metropolitan Police Magistrate of North London, to state a case to raise the question as to who was liable for the District Surveyor's fees where a building is nearly completed by the original builder, and, on his failing, quite completed by another.

The facts were shortly as follows:—Notice was given by a Mr. James, a builder, for the building of fourteen houses, and he proceeded to build them, and had roofed in all the principal buildings, leaving only certain offices not covered in, when he became a bankrupt. In February of last year a Mr. Prout, another builder, gave notice to complete the buildings under the Metropolitan Building Act, 1855, which enacts that "Before any building shall be commenced notice shall be given to the District Surveyor, and if the building shall be interrupted for more than three months, then before the building is recommenced notice is to be given that it is to be resumed, so that the District Surveyor may watch the building and see that the Building Acts are complied with." Mr. Prout finished the houses by covering in the subsidiary buildings, and then the District Surveyor applied for his fees, as provided for in the schedule to the Act. Mr. Prout contended that the fees ought to have been recovered from Mr. James, or proved under his bankruptcy, under Section 51 of the Act, as to fees of District Surveyors, which provides that a month after the building is covered in the District Surveyor shall be entitled to receive the fees from the builder employed in erecting such building, as doing the work. The Surveyor, not receiving his fees, summoned Mr. Prout before the magistrate, but he, after referring to the case of Tubb *v.* Good (5 Queen's Bench Law Reports, 443), thought that the claim could not be supported, dismissed the summons, and refused to state a case.

Mr. Smith contended that the case the magistrate relied upon was different from the present case. In the case of Tubb *v.* Good the buildings had been completely roofed in and the District Surveyor had tried to get his fees from the owner when the buildings were fully finished, but in the case in question at the time the first builder became bankrupt the buildings were not completed and not covered in, and so the second builder was liable for the fees.

The Court granted a rule *nisi*.

MEETINGS.

FRIDAY, FEBRUARY 15.

Architectural Association.—Mr. H. H. Statham on "The Bridges of London Architecturally Considered." With Illustrations. 7.30 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. J. Castell-Evans on "Physics and Chemistry: Water." IV. 8 p.m.

Institution of Junior Engineers.—Mr. Walter J. Fryer on "The Practical Application of Alternating-Current Motors." 8 p.m.

SATURDAY, FEBRUARY 16.

Edinburgh Architectural Association.—(1) Visit to 29, Moray-place; (2) Visit to 25, Learmonth-terrace.

Queen's College, Cork.—Mr. Arthur Hill on the "History of Architecture." XI. 3 p.m.

Architectural Association.—Second spring visit, to the new Pavilion Music Hall, Whitechapel-road. Mr. E. A. Runtz, architect. 3 p.m.

SUNDAY, FEBRUARY 17.

South Place Institute.—Mr. George Dew on "Sixty Years of Industrial Progress in the London Building Trades." 4 p.m.

MONDAY, FEBRUARY 18.

Surveyors' Institution.—Mr. Arthur Pain, C.E., on "Light Railways." 8 p.m.

Royal Academy (Lectures on Sculpture).—Mr. A. S. Murray on "The Schools of the Late Sixth and Early Fifth Century B.C." I. 4 p.m.

Victoria Institute.—4.30 p.m.

Architectural Section, Glasgow Philosophical Society.—Mr. Richard Ferris on "The Relation of Modelling to Sculpture and the Industrial Arts." 8 p.m.

TUESDAY, FEBRUARY 19.

Institution of Civil Engineers.—Mr. C. Butters and Mr. E. Smart on "Plant for the Extraction of Gold by the Cyanide Process." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers on Physics and Chemistry).—Mr. J. Castell-Evans on "The Chemistry of Fuel and Combustion." V. 8 p.m.

Glasgow Architectural Association.—Mr. S. Henbest Capper, M.A., on "The Monks and their Abbeys." 8 p.m.

WEDNESDAY, FEBRUARY 20.

Architectural Association Camera Club.—Papers on "Sketching *v.* Photography." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Liverpool Engineering Society.—8 p.m.

Carlisle Architectural, Engineering, and Surveying Association.—Mr. W. Pogson on "Iron Roofs."

Northern Architectural Association.—Mr. R. B. Dick on "Architectural Sketching." 7.30 p.m.

THURSDAY, FEBRUARY 21.

Royal Academy (Lectures on Sculpture).—Mr. A. S. Murray on "The Schools of the late Sixth and Early Fifth Century, B.C." II. 4 p.m.

Society of Antiquaries.—8.30 p.m.

Institution of Electrical Engineers, (No. 18, John-street, Adelphi).—Dr. John Hopkinson, M.A., F.R.S., Past President, on "Propagation of Magnetism in Iron." Illustrated by Experiments. 8 p.m.

FRIDAY, FEBRUARY 22.

Institution of Civil Engineers (Students' Meeting).—Mr. William G. Wales on "Caissons and Gates for closing Lock and Dock Entrances." 8 p.m.

Royal Institution.—Professor A. Schuster on "Atmospheric Electricity." 9 p.m.

Sanitary Institute (Lectures for Sanitary Officers on Physics and Chemistry).—Mr. J. Castell-Evans on "Sanitary Chemistry." VI. 8 p.m.

SATURDAY, FEBRUARY 23.

Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, The King's Hall, Holborn Restaurant. 6.30 p.m.

Queen's College, Cork.—Mr. Arthur Hill on the "History of Architecture." XII. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

405.—MACHINES FOR SHEET METAL LATHING: *G. Hayes.*—This is a machine for cutting a slit through a sheet of metal at intervals throughout its length, with an arrangement for corrugating and at the same time expanding the slits or openings. By suitable gearing a pair of rolls are revolved, these rolls having their outside surfaces formed in a system of annular ridges and hollows. The sheet is corrugated by compressing it at intervals across its breadth and pressing out of plane the intervening portions, thus expanding the openings and converting each sheet into finished lathing.

3,075.—MANHOLE DOORS: *A. Lambie.*—This patent relates to the opening and closing of manhole doors by eccentric acting organs, and is effected by a series of bolts or pins projecting from the outer surface of door, each bolt having an arm or eyebolt mounted by an eye at one end and tightened by a screw nut. At the end of each arm, which is at right-angles to its screw bolt, is fixed an eccentrically-mounted cam. On turning the eccentrics the door is raised or lowered as desired.

4,377.—FIREPROOF FLOORS: *R. Astley.*—For protecting the underside of joists and girders against heat a number of ⊥-shaped tiles of fireclay, with dovetailed grooves for receiving the plaster, are placed on each side of the joists and girders, the space being filled up with concrete.

4,490.—CHIMNEY-TOPS AND VENTILATORS: *G. Housden and another.*—An apparatus for preventing the down-draught and increasing the up-draught of the chimney, consisting of a tube surmounted by a head composed of four truncated cones so joined as to form two heads in continuity. A number of mouths are placed in the space formed by the junction of the two heads, and arranged to catch the passing current of air and cause an up-draught. A cone for preventing down draught is secured to the head by suitable stays.

6,027.—HINGES: *Tonks, Limited.*—Reels or tubes of iron are formed with flanges on their ends, and with an axial hole to fit upon the pin of finished hinge. The reels are then threaded upon the axis and placed in the mould in which the flap or knuckles are cast. During this operation the metal runs round enclosing the reels, and connects the whole firmly together.

15,584.—NAILS: *H. E. Holloway.*—Consists in making a recess in either side of all flat nails for the purpose of gaining extra hold, also diamond points are formed for easier driving of same.

23,040.—WINDOWS, CHEVAL GLASSES, &c.: *R. Lanham.*—This is a method of reversing windows, also applicable to mounted mirrors. The pivot has a disc with bevelled edges fitted to the side of the glass. A perforated plate having corresponding bevelled edges is fixed into the frame. One fits into the other, and a thumbscrew is employed to clamp the two together.

23,589.—BRUSHES: *W. P. Thompson.*—Consists in keeping the raw cocoa fibres in water, and an infusion of hot water and soda. After washing and wrapping up in bundles they are boiled in hot water and dried, then trimmed and made ready to be used for paint and other brushes.

NEW APPLICATIONS FOR LETTERS PATENT.

JANUARY 29.—2,036, H. Cordes, Boat Nails.—2,038, H. Cordes, Speaking-tubes.—2,049, F. King, Door-silencer.—2,052, H. Brierley, Sanitary Cisterns.

JANUARY 30.—2,082, E. Robertson, Windows.—2,090, A. McIntyre, Opening Window.—2,094, G. Love and B. Cochrane, Safety-tap for Kitchen Boilers.—2,126, T. Salter, Water-closet Pans or Basins.

JANUARY 31.—2,174.—J. Brierley, Bolt-end Cutting-tool.—2,184, G. Butt, Picture Frame Mouldings.—2,201, J. Holt and others, Manufacture of Crucibles, Fire-clay, Refractory and Non-conducting Bricks and Blocks, &c.

FEBRUARY 1.—2,239, J. Parker, Bell-handles and Bell-pushes.—2,244, W. Wall, Sewer-ventilators.—2,253, J. Whiteside, Pipe Soldering Cramp.—2,268, S. Bastow, Windows.—2,283, C. Ellis and others, Tiling of Roofs, &c.—2,300, T. Shaw, Closet Seats.

FEBRUARY 2.—2,342, F. Harper, Nut- and Screw-driver.—2,354, T. Jeffery, Door or Portière Rods.—2,358, J. Hall, Kilns.—2,365, F. Lawson, Architects' Set Squares.

PROVISIONAL SPECIFICATIONS ACCEPTED.

24,554, J. Davidson, Securing Door Knobs.—24,789, S. Dalziel and J. Oliver, Alarms for use with Doors, Windows, &c.—24,945, H. Enoch, Flushing and other Cisterns.—216, H. Wood, Bricks.—232, W. Easun, Soil-pipe Exhaust to draw the sewer-gas out of ventilating-pipe from drains and diffuse it.—529, C. Rogers, Closet-pans and Water-closet Ventilation.—722, R. Matthews and others, Drain-

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*New School	Swanage School Board	30*l.* 15*l.*	Mar. 6
*Shops, Offices, Two Hotels, &c. Preston	N. Miller	150*l.* 100*l.* and 50*l.*	May 27

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Brick Sewers, &c.	Kearsley (Lancs) U.D.C.	T. Nuttall	Feb. 19
Oddfellows' Institute, Shaw, Lancs.	.....	S. Stott	do.
Police Stations, Cudworth, Yorks	Standing Joint Com. & West Riding C. C.	J. V. Edwards	do.
Warehouses, Union Quay, North Shields	Tynemouth Corp.	J. F. Smillie	do.
*Works and Materials	Hammersmith Vestry	H. Mair	Feb. 20
*Sand and Ballast	Mile End Old Town Vestry	J. M. Knight	do.
Schools, South Ossett, Yorks	.....	J. Kirk & Sons	do.
Street Works, Tranmere	Birkenhead Corp	C. Brownridge	do.
Alterations, &c. to Schools, near Downham Market, Norfolk	Southery School Board	*Official*	do.
*Guernsey Granite Spalls	West Ham Union	do.	do.
*Removal of House Refuse	St. Pancras Vestry	do.	do.
Gasholder, &c.	Pickering Gas & Water Co.	H. Tobey	Feb. 21
Two Gas Purifiers	Darlington Corp.	T. Smith	do.
Two Villas, Asborne Park, Belfast	.....	Young & Mackenzie	Feb. 23
Sewering, Levelling, &c. Rowhedge, Essex	.....	G. H Page	do.
Road Metal	Bridgwater High. Bd.	S. Ingram	do.
Gasholder Tank (100 ft. diam.)	Blyth & Cowpen (Northumberland) Gas Co.	*Official*	do.
Office Extensions, Local Government Board, Edinburgh	Office of Works	do.	do.
Pipe Sewers, &c.	Filey (Yorks) U.D.C.	do.	do.
Additions to Shortridge Hall, Alnwick	Robt. Deuchar	M. T. Wilson	Feb. 25
Chapel, Walls, &c.	Havant (Hants) U.D.C.	A. E. Stallard	do.
Lancashire Setts, Kerbs, &c.	Stockport Corp.	J. Atkinson	do.
Additions, &c to Schools, Rastrick	.....	B. Stocks	do.
Additions, &c. to Eden-place, Kirkley Stephen (Westmoreland)	Col. Mason	Robt. Walker	do.
Paving, &c. Vauxhall Quay, Sutton Wharf	Plymouth Corp.	Jas. Paton	do.
Earthenware Pipe Sewer (6,350 yds.)	Keighley U.D.C.	Barber, Hopkinson & Co.	do.
Drainage Works at Workhouse, &c. Firvale	Sheffield Union	T. A. Murray	do.
Stoneware Pipe Sewers	Hastings Corp.	P. H. Palmer	do.
*Re-drainage of Dispensary	St. Marylebone Guar.	A. Saxon Snell	do.
Sewerage, Dalmellington, N.B.	Ayrshire C. C.	H. V. Eaglesham	Feb. 26
*Well in Brickwork and Cast-Iron Cylinders	East Cowes U.D.C.	Lemon & Blizard	do.
*Works and Materials	West Ham Council	Lewis Angell	do.
*Works and Materials	Willesden Dist. Coun.	O. Claude Robson	do.
*Road Making and Paving Works	do.	do.	do.
Flags, Kerbs, &c.	Bury (Lancs) Corp.	*Official*	do.
*Galvanised Corrugated Iron Sheets	West Ham Council	do.	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Warehouse, Stabling, &c. Morley, Yorks	Morley Indus. Co-op. Soc. Lim	do.	Feb. 27
*Supply of Road Materials	Cranbrook Dist. Coun.	do.	do.
*Three Hundred Quarter Malting	.....	Evans & Son	do.
Alterations, &c. to National Schools, Knaresborough	.....	J. Gavin Brown	Feb. 28
Paving Setts, Kerbs, &c.	Wittington (Lancs) U.D.C.	A. H. Mountain	do.
Haslingden Flagging (770 square yards), Crosby-road South, Seaforth	Waterloo-with-Seaford U.D.C.	F. S. Yates	do.
Schools, Corfe Castle, Dorset	Committee	.....	do.
*Pulling-down and Rebuilding Boundary Wall	Paddington Burial Board	*Official*	do.
*Paving Materials	Greenwich Bd. of W.	do.	do.
*Works and Materials	Bermondsey Vestry	do.	Mar. 2
*Dormitory and Office Fittings	North Surrey District Schools	do.	do.
Drainage, Tanks, &c.	Dartmouth Corp.	T. O. Veale	do.
Sewerage Works	Clayton-le-Moors U.D.C.	Brierley & Holt	Mar. 4
Sewage Disposal Works, Great Harwood, Lancs.	Clayton-le-Moors. &c. Joint Sewerage Bd.	do.	do.
*Works and Materials	Hendon U.D.C.	S. S. Grimley	do.
*Broken Guernsey Granite	Middlesex County C.	*Official*	do.
*Making-up Roads	do.	do.	do.
*Rebuilding River Wall, Hammersmith	Kensington Vestry	do.	do.
*Post Office, Portsmouth	Com. of H. M. Works	do.	Mar. 6
Additions to Hospital, Clayponda-lane	Brentford U.D.C.	N. Parr	do.
Granite Road Metal	East Retford Corp.	J. D. Kennedy	do.
Road Maintenance, Maidstone	Kent County Council	F. W. Ruck	do.
*Baths and Washhouses	St. Mary (Newington) Vestry	E. B. I'Anson	do.
School, near Odiham, Hants	Greywell School Bd	J. A. Eggar	Mar. 6
Gasholder, &c.	Ilkeston (Derby) T. C.	F. C. Humphrys	do.
Additions to Schools	Tendring (Essex) Sch. Board	J. W. Start	Mar. 7
*Works and Materials	Hornsey U.D.C.	E. J. Lovegrove	Mar. 11
*Premises, Harrow	D. T. Rigden	W. J. Jennings	No date
*Alterations, &c. to Schools	Watford School Bd.	W. H. Syme	do.
Schools, Needham Market, Suffolk	Barking School Bd.	J. S. Corder	do.
Road Stone and Slag	Towcester (Northants) Highway Board	R. W. Rolfe	do.
Seven Houses, Heeley, Sheffield	.....	J. P. Earle	do.
Lodge at District Hospital, Walsall	.....	Bailey & M'Connal	do.
Club Premises, Windhill, Yorks.	.....	J. Crawshaw	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Foreman of Paviors and Sewermen	St. Saviour's Board of Works	27.	Feb. 22
*Building Inspector	Burton-upon-Trent Corp.	120*l.*	Feb. 25
*City Surveyor	Canterbury U.S.A.	350*l.*	Feb. 27
*Engineer and Surveyor	Dover Town Council	350*l.* &c.	Mar. 1

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi., vii., viii., x. and xx. Public Appointments, pp. xviii.

age.—783, A. McBean, Windows.—851, A. Watt, Direct Combustion, Smoke-consuming Furnace, and Fireplace Back.—926, G. Holloway, Ventilating Grate for Drains, &c.—937, J. Rohde, Combination Window, Sash-fasteners and Draught Excluders.—1,092, C. Major, Fireproof and Ventilating Floors.—1,107, S. Firth, Fire Grates.—1,136, T. Houghton and others, Windows.—1,165, H. Armytage, Fireproof Shutters for doors, &c.—1,167, C. Brix, Artificial Stone.—1,184, G. Newman, Floor Door-springs and checks.—1,256, R. Hitchins, Slabs of Plaster Cement, or Composition.—1,285, W. Speirs, Windows.—1,337, F. Kitto and W. Haworth, Bricks, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.

3,023, B. Haigh, Flushing Apparatus.—6,538, J. Taylor, Domestic Fireplaces.—24,643, H. and G. Jones, Rock-drills.—25,165, A. Weil and W. Prasse, Moulding Tiles.—25,364, E. Read, Window Catches.—159, J. Jones and others, Water-waste Preventers or Flushing Apparatus.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JANUARY 28.—By *J. & R. Kemp & Co.*: l.g.r. of 71*l.* 8s., Osborne Villas, Clewer, Berks., u.t. 60 yrs., g.r. 4*l.*, 1,235*l.*; 141, Stanhope-st., Hampstead, u.t. 30 yrs., g.r. 10*l.*, 800*l.*

JANUARY 29.—By *W. T. Marsh*: 1 to 4, Emma-pl., Kensington, f.. r. 142*l.*, 2,505*l.*; 1a, Emma-pl., and 40, Abingdon-rd., f., r. 85*l.*, 1,250*l.*; 53, Abingdon-rd., freehold livery stables, r. 150*l.*, 2,650*l.*—By *B. Brown*: 50, Rye-lane, Peckham, f., r. 35*l.*, 880*l.*; 1a, Acland-st., Limehouse, u.t. 78 yrs., g.r. 9*l.* 10s., 560*l.*—By *W. W. Kead & Co.*: "Hypathia Villa," Church-rd., Bexley Heath, f., 450*l.*; 92, Chetwynd-rd., Kentish Town, f., r. 38*l.*, 440*l.*—By *T. N. Turner*: 21, Queen's-pl., Islington, u.t. 75 yrs., g.r. 4*l.* 10s., 205*l.*—By *Nokes & Nokes*: 73, Barnsbury-rd., Barnsbury, u.t. 8 yrs., g.r. 10*l.*, r. 65*l.* 13s., 50*l.*; 4, Mabledon-pl., St. Pancras, u.t. 11 yrs., g.r. 18*l.* 18s., 125*l.*—By *C. H. Brown*: 38, Haydon's Pk.-rd., Wimbledon, u.t. 83 yrs., g.r. 5*l.*, r. 22*l.*, 165*l.*; 7, Lawn Villas, Lewisham, u.t. 96 yrs., g.r. 8*l.* 10s., 370*l.*

JANUARY 30.—By *R. Tidey & Son*: 146, Amhurst-rd., Stoke Newington, u.t. 72 yrs., g.r., 8*l.*, r. 53*l.*, 500*l.*; 313, Amhurst-rd., u.t. 72 yrs., g.r. 7*l.*, r. 42*l.*, 400*l.*; 99 and 101, Englefield-rd., Islington, u.t. 47 yrs., g.r. 13*l.*, r. 90*l.*, 805*l.*; 76 and 78, Down's Pk.-rd., Hackney, u.t. 74 yrs., g.r. 14*l.* 14s., 780*l.*; 105, Tottenham-rd., De Beauvoir Town, u.t. 30 yrs., g.r. 1*l.*, 295*l.*—By *M. Liell & Son*: 10 and 12, Clemence-st., Limehouse, u.t. 60 yrs., g.r. 6*l.*, 620*l.*; 9 and 13, Clemence-st., u.t. 65 yrs., g.r. 8*l.*, 535*l.*; 45, Tredegar-rd., Bow, u.t. 67 yrs, g.r. 5*l.* 10s., 375*l.*; 77 to 83 (odd), Fisher-st., Canning Town, f., r. 88*l.* 8s., 825*l.*—By *H. Holmes & Co*: 16, Charlton-st., Marylebone, u.t. 18 yrs., g.r. 24*l.*, 300*l.*

JANUARY 31.—By *Hunter & Hunter*: 48 and 50, Blundell-st., Caledonian-rd., u.t. 57 yrs., g.r. 11*l.*, r. 64*l.*, 450*l.*; 65, Park Ridings, Wood Green, f., r. 21*l.*, 310*l.*; 1, 2, and 3, Woodside Cottages, Highgate, f., 558*l.*; 4, 6, 7, and 9, Fonthill-mews, Finsbury Park, u.t. 72 yrs., g.r. 33*l.*, 50*l.*; f.g.r. of 18*l.* 18s., Marlboro'-rd., Holloway, reversion in 81 yrs., 520*l.*—By *C. P. Whiteley*: 16, Walford-rd., Stoke Newington, u.t. 69 yrs., g.r. 6*l.* 5s., r. 36*l.*, 350*l.*; 24, Bayston-rd., u.t. 80 yrs., g.r. 5*l.* 10s., r. 32*l.*, 325*l.*; 36, Aylesford-st., Pimlico, u.t. 42 yrs., g.r. 8*l.*, 340*l.*; 51 and 53, Pownall-rd., Haggerston, u.t. 49 yrs., g.r. 6*l.*, 445*l.*; 11, 12, and 13, Winslade-rd., Clapton, u.t. 50 yrs., g.r. 12*l.*, 610*l.*—By *Furber, Price, & Furber*: f.g.r. of 22*l.* 15s., Tulse Hill, reversion in 73 yrs., 620*l.*; f.g.r. of 60*l.*, reversion in 68 yrs., 1,620*l.*—By *T. G. Wharton*: 11, Dartnall-rd., Old Kent-rd., u.t. 86 yrs., g.r. 7*l.* 10s., 210*l.*; 45, 47, and 49, Dartnall-rd., u.t. 86 yrs., g.r. 22*l.* 10s., 600*l.*; 7, Saratoga-rd., Clapton, u.t. 88 yrs., g.r. 7*l.*, r. 35*l.* 2s., 275*l.*—By *Newbon & Co.*: 25 and 27, Queen Margaret's Grove, Stoke Newington, u.t 55 yrs., g.r. 10*l.* 10s., r. 72*l.*, 700*l.*; 5, Artillery-passage, Spitalfields, f. (one third share only), 140*l.*

FEBRUARY 1.—By *Green & Son*: F.g.r. of 275*l.*, West Ferry-rd., Millwall, reversion in 80 yrs., 6,350*l.*; 5, Auckland-rd., Battersea, u.t. 50 yrs., g.r. 5*l.*, 185*l.*—By *Montagu Robinson & Watson*: "Victoria Villa," Victoria-rd., Kingston-on-Thames, f., 595*l.*; a plot of freehold land, Hawk's-rd., 100*l.*—By *J. A. & W. Tharp*: 16, Whateley-rd., Dulwich, u.t. 77 yrs., g.r. 5*l.*, r. 26*l.*, 100*l.*; f g.r. of 7*l.*, Elm-rd., Leyton, reversion in 95 yrs., 175*l.*; f.g.r. of 11*l.*, Fillebrook-rd., Leytonstone, reversion in 95 yrs, 290*l.*; f.g.r. of 6*l.*, Lonsdale-rd., reversion in 95 yrs., 165*l.*; f.g.r. of 11*l.*, Addison-rd., Wanstead, reversion in 95 yrs., 295*l.*; l.g.r. of 5*l.*, Middleton-rd., Dalston, u.t. 43 yrs., 80*l.*; 19 and 21, Harvey-rd., Leytonstone, f., r. 55*l.* 18s., 640*l.*; 27 and 29, Harvey-rd., f., 660*l.*; 4, 5, 6, and 7, Laurel-grove, Sydenham, f., 670*l.*; "Park House," Myrtle-grove, f., r. 30*l.*, 390*l.*; 6 and 7, North-st., Mile End, f., 360*l.*; 21, 23, and 25, Code-st., Bethnal Green, and 7 and 7A, Buxton-st., u.t. 17½ yrs., g.r. 25*l.*, 450*l.*; 11 to 18, Laurel-st., Dalston, u.t. 28½ yrs., g.r. 17*l.* 10s., r. 222*l.*, 1,470*l.*

FEBRUARY 4.—By *Beningfield & Son*: F.g.r. of 274*l.* 10s. per annum, Graveney-rd., Tooting, reversion in 83 yrs., 6,675*l.*

FEBRUARY 5.—By *Segrave, Bruwett, & Taylor*: 19, 21, 23, 25, and 27, Ireton-st., Bow, u.t. 78 yrs., g.r. 15*l.*, 480*l.*; 156, 158, 160, and 162, Parnell-rd., Old Ford, u.t 74 yrs., g.r. 18*l.*, 305*l.*; 77 to 87 odd, Wyke-rd., u.t. 79 yrs., g.r. 18*l.*, 450*l.*; 69, 71, 75, 77, 79, 97 to 111, 119 to 133, 161 to 169 odd, Monier-rd., u.t. 82 yrs., g.r. 91*l.*, 1,800*l.*; 21 to 81 odd, Hotham-st., Stratford; 112 to 122 even, Maryland-rd.; 1 to 20, Ruth-st., sold privately.—By *A. Richards* (at Tottenham): 1 to 8, Pleasant-pl., Tottenham, f., 1,200*l.*; 110 and 112, Church-rd., u.t. 71 yrs., g.r. 5*l.*, 225*l.*; 74, Summerhill-rd., f., r. 24*l.*, 410*l.*

FEBRUARY 6.—By *Hobson, Richards, & Co.*: 1, Rectory-rd., Stoke Newington, u.t. 67 yrs., g.r. 9*l.* 5s., r. 38*l.*, 295*l.*; 9, Rectory-rd, u.t. 67 yrs., g r. 9*l.* 5s., r. 40*l.*, 325*l.*; 40 to 50 (even), Church-rd., u.t. 67 yrs., g.r. 52*l.* 10s., 1,350*l.*—By *Frank Jolly & Co.*: 50, Stamford-rd., Tottenham, u.t. 63 yrs., g.r. 4*l.* 10s., 125*l.*

FEBRUARY 7.—By *Boyton & Pegram*: Freehold building site, Crab Tree-lane, Fulham, 1a. 3r. 0p., 2,120*l.*; "Rose Cottage," Crab Tree-lane, f., r. 26*l.*, 250*l.*—By *H. A. Henderson*: 17, 19, and 21, Bulwer-rd., Leytonstone, u.t. 82 yrs., g.r. 12*l.*, 700*l.*—By *John Jacobs & Son*: 3, Albert-ter., Regent's Pk., u.t. 48 yrs., g.r. 15*l.* 6s. 8d., 1,270*l.*—By *A. J. Spooner & Co.*: 49, Marsden-st., Kentish Town, u.t. 46 yrs., g.r. 5*l.* 10s., 160*l.*—By *Farebrother, Ellis, Clark, & Co.*: 99, Oakley-st., Lambeth, f., 460*l.*; 7, Silver-st., Greenwich, f., r. 20*l.*, 245*l.*

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.	ton	8/c/o 0/0/0
Teak, E I.	load	10/0/0 16/0/0
Sequola, U.S. ft. cu		1/10 2/2
Ash, Canada load		3/0/0 4/5/0
Birch, do.		3/0/0 4/5/0
Elm, do.		3/15/0 5/0/0
Fir, Dantsic, &c.		1/10/0 3/0/0
Oak, do.		2/15/0 4/15/0
Canada		5/5/0 6/15/0
Pine, Canada red		2/15/0 3/5/0
Do. Yellow		3/10/0 5/15/0
Lath, Dantsic. fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/15/0 5/0/0
Odessa, crown		2/15/0 5/0/0
Deals, Finland 2nd & 1st std	100	7/0/0 9/0/0
Do. 4th & 3rd		7/0/0 8/0/0
Do. Riga		7/0/0 8/10/0
St. Petersburg, 1st yellow		9/10/3 12/0/0
Do. 2nd yellow		7/10/0 9/0/0
Do. white		8/0/0 10/10/0
Swedish		7/0/0 15/10/0
White Sea		7/10/0 15/0/0
Canada, Pine 1st		21/0/0 24/10/0
Do. do. 2nd		16/10/0 17/10/0
Do. do. 3rd, &c.		8/0/0 10/10/0
Do. Spruce, 1st		8/10/0 10/0/0
Do. do. 3rd and 2nd		6/10/0 7/10/0
New Brunswick		6/0/0 7/0/0
Battens, all kinds		5/0/0 21/0/0
Flooring boards, sq., 1 in. prep. 1st		0/9/6 0/14/0
Do. 2nd		0/7/0 0/11/6
Other qualities		0/5/0 0/7/0
Cedar, Cuba	..ft.	/3 /4
Honduras, &c.		/3 /4½
Mahogany, Cuba		/3½ /6
St. Domingo, cargo av.		/3½ 1/6
Mexican do. do.		/3 /4
Tobasco do. do.		/3½ /6
Honduras do.		/3½ /5½
Box, Turkey	ton	4/0/0 15/0/0
Rose, Rio		7/0/0 16/0/0
Bahia		6/0/0 15/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER (*continued*).

Satin, Porto Rico	c/o/6	o/l/6
Walnut, Italian	o/o/3½	o/o/7

METALS.

Iron—Pig, in Scotland	ton	2/1/3½ o/o/o
Bar, Welsh, in London		5/12/6 5/15/0
Do. do. at works in Wales		5/2/6 5/5/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		42/10/0 43/0/0
Best selected		42/10/0 44/0/0
Sheets, strong		50/0/0 o/o/o
Chili bars		39/7/6 39/12/6
YELLOWMETAL	lb	o/o/4½ o/o/4½
LEAD—Pig, Spanish	ton	9/10/0 9/12/6
English com. brands		9/11/3 9/13/0
Sheet, English, 6 lbs. per sq. ft. and upwards		10/15/0 11/0/0
Pipe		11/15/0 o/o/o
ZINC—English sheet	ton	18/10/0 19/0/0
Vieille Montagne		19/12/0 o/o/o
TIN—Straits		59/15/0 60/5/0
Australian		59/17/6 60/7/6
English Ingots		64/12/0 64/15/0
Banca		61/12/0 62/0/0
Billiton		60/12/0 61/0/0

OILS.

Linseed	ton	21/5/0 21/10/0
Cocoanut, Cochin		25/0/0 o/o/o
Do. Ceylon		23/0/0 o/o/o
Palm, Lagos		23/0/0 o/o/o
Rapeseed, English pale		22/0/0 o/o/o
Do. brown		20/5/0 20/10/0
Cottonseed ref.		17/5/0 18/5/0
Oleine		21/0/0 22/10/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/0/0 12/0/0
TAR—Stockholm	barrel	1/1/0 1/1/6
Archangel		0/15/0 0/16/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ABERDEEN.—Accepted for the construction of sewers, &c., Bon Accord-square and Oldmill-road, for the Town Council. Mr. Wm. Dyack, Burgh Surveyor, Town House, Aberdeen:—
James Warrack, Aberdeen £148 7 8½

ALNWICK.—Accepted for additions to Prudhoe Villa, for Mr. Jos. Sanderson. Mr. Geo. Reavell, jun., architect, Alnwick:—
Masonry.—George Davison £105 7 6
Joinery.—John Short & Son 70 0 0
Slating.—Joseph Purdie 16 6 8
Plumbing.—John N. Reavell 29 17 6
Plastering.—George Pickard 17 16 0
Painting.—James Wallace 7 15 0
Total £247 2 8
[All of Alnwick.]

ANNFIELD PLAIN (co. Durham).—For the erection of two houses, near Hare Law Cemetery, for Messrs. G. R. Appleby and W. Willmott. Mr. A. Routledge, architect, West Stanley:—
Building, Slating, and Plastering.—J. Dunn, West Rye* £230
Joining, Plumbing, and Painting.—T. Mordin, Dipton* 139
Completing all Work.—Surtees 449
Joinery.—Johnson 159
Masonry and Plastering.—T. Storey 162
Masonry.—Johnson 335
* Accepted.

ASTON-CUM-AUGHTON (Yorks.).—For the erection of a school teacher's residence, Lodge-lane, for the School Board. Mr. F. Leonard Sorby, architect, Todwick, near Sheffield. Quantities by the architect:—

R. H. Rawson	£795	F. Boaler	£607
Jas. Fidler	660	Waller & Turner	546
Henry Sykes	644	John Lister, Aston*	535
Pinder Brothers	612	* Accepted.	

[Architect's estimate, £520.]

BIRKENHEAD.—Accepted for flagging, channelling, &c., passages, for the Corporation. Mr. Chas. Brownridge, C.E., Town-hall, Birkenhead:—
Jones & Bancroft, 134, Oxton-rd., Birkenhead .. £217 11 10

CAERPHILLY.—For widening and improving road between Caerphilly and Senghenydd, for the Urban District Council. Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly. Quantities by Surveyor:—

Jones & Thornley	£5,367 15 0	John Mackay	£1,591 9 0
John Winnel	2,869 17 0	T. W. Davies	1,968 7 10
Jenkin, Brock, & Son	2,702 4 2	Wm. Morgan	1,959 4 8
James Allen	2,235 1 8	Lloyd & Powell	1,891 0 5
R. J. Mathias	2,195 14 2	Thos. Taylor	1,820 12 6
Thos. Harries	2,142 16 8	Thos. Rees, Ely, near Cardiff*	1,801 19 8
E. H. Page	2,048 16 8	David Love & Sons	1,771 4 2
Barnes, Chaplin, & Co.	2,042 4 2	Batchelor & Snowden	1,765 10 0
M. Gibbon	2,029 18 4		

[Engineer's estimate, £1,996.]
* Accepted.

CANTERBURY.—For pulling down premises, and erection of four cottages on same site, St. Radigund-street. Mr. W. J. Jennings, architect, 4, St. Margaret-street, Canterbury:—

Amos & Food	£860	F. T. Gentry	£738
J. J. Hull	780	W. Judges, Boughton, near Faversham (accepted)	718
W. W. Martin	750		

DARTFORD.—For the supply of 250 tons best blue Guernsey granite spalls for the Union Guardians:—

	s. d.		s. d.
Jennings	11 0	Wm. Griffiths, 283, Kingsland-road, N.E.*	10 2
A. & F. Manuelle	10 10	Kent Road Maintenance & Stone Supply Co., Ltd.	9 9
Wm. Muir & Co.	10 9		
John Mowlem & Co.	10 9		

* Accepted.

DARWEN (Lancs.).—Accepted for extensive additions to stores for the Darwen Industrial Co-operative Society. Mr. J. B. Thornley, architect, Market-street, Darwen. Quantities by the architect:—
Masonry and Bricklaying.—J. Knowles, Darwen £4,318
Joinery and Slating.—R. Shorrock, Darwen 3,149
Ironwork—Cast and Wrought.—H. J. & A. Coulthurst, Darwen .. 452

DORKING.—For the construction of boundary walls, &c., at the cemetery, for the Burial Board. Messrs. White & Sons, surveyors, 18, High-street, Dorking. Quantities not supplied:—

G. A. Franks	£220 0 0	Pledge & Son	£193 15 6
A. Chalcraft	198 10 0	A. P. Clear, Dorking*	189 0 0

* Accepted.

DOVER.—Accepted for the supply of 1,850 tons broken granite, and other road materials, for the Town Council:—

	Guernsey Granite. Per Ton. s. d.	Siftings. Per Ton. s. d.
J. Mowlem & Co.	10 6	7 4
	Cornish Kerb. Per c. ft. s. d.	Radiated Kerb. Per c. ft. s. d.
W. Hosken & Co.	1 0	1 2

[Both of London.]

DOVER.—For the construction of sewer and surface drain, Southroad, for the Town Council:—

J. J. Hall	£168 19 9	G. F. Keeler*	£150 0 0
G. Lewis & Sons	163 0 0	* Accepted.	

[All of Dover.]

DURHAM.—For new water-closet block, dining-room, &c., at the Lunatic Asylum, Sedgefield, Mr. W. Crozier, Architect, Shire Hall, Durham. Quantities by Mr. J. Ezra Miller, Tunstall-road, Sunderland:—

Geo. Marshall & Son	£764 10 0	Thomas Hunter	£643 0 10
W. C. Atkinson	759 15 10	Draper & Sons, West Rainton*	637 11 7
Joseph Elliot	705 0 0		
John George Gradon	676 7 0	* Accepted.	

EGHAM.—For erecting new house, Rusham Park Avenue, Egham, for Mr. F. Turner. Mr. Thos. R. Richards, architect and surveyor, 42, Theobald's-road, W.C. Quantities supplied:—

Norris & Sons	£1,033	G. H. King	£950
George Reavell	985	J. Sleep*	779

* Accepted.

FARNHAM.—For erecting new Board Schools, East-street, Farnham. Mr. J. A. Eggar, architect, Farnham:—

Hall	£7,780 10	Jenkins & Sons	£6,449 0
Belham & Co.	7,473 0	Kemp	6,297 0
Martin, Wells, & Co.	6,890 0	Fitt	6,279 0
Patrick & Co.	6,796 0	Bottrill & Son	6,230 0
Smith	6,757 10	Peters	6,125 0
Cluter	6,598 10	Chinchen, Bournemouth*	6,000 0
Field & Co.	6,568 0	* Accepted.	
Goddard & Sons	6,548 0		

HENLEY-ON-THAMES.—Accepted for sewerage extension works, contracts 1 and 2, for the Corporation of Henley-on-Thames. Messrs. Shone & Ault, C.E.'s., Victoria-street, S.W.:—
B. Cooke & Co.. Battersea £8,750

KING'S LYNN.—For the construction of a sewer, Saddlebow-road, for the Corporation. Mr. E. J. Silcock, C.E., Borough Engineer, King's Lynn:—

J. W. Cockrell	£752 7 10	R. W. Fayers	£619 13 8
W. F. Smith	710 0 0	R. Clarke, jun.	580 0 0
Girling & Coe	703 0 0	H. Collison, Lynn*	574 6 0
J. Bateman	654 2 1	* Accepted.	

[Engineer's estimate, £600.]

LONDON.—For the supply of 500 tons of broken blue Guernsey granite, for the Vestry of St. Matthew, Bethnal Green. Mr. F. W. Barratt, Surveyor, Vestry Hall, Church-row, Bethnal Green, E.:—

	Per ton. s. d.		Per ton. s. d.
William Gibbs	14 7	L. Somerfield	13 10
A. & F. Manuelle	14 4	W. Muir & Co.	13 5
J. Mowlem & Co.	14 1	W. Griffiths	12 9

LONDON.—For the erection of conveniences at Bostall Heath, for the London County Council:—

Woolwich and District Co-operative Builders, Ltd.	£650 10 0	W. Wells	£581 0 0
E. Proctor	629 0 0	A. Wallis	580 5 5
H. J. Stephens	591 16 0	R. H. Julyan & E. J. Locker	499 16 0
		C. Godbolt	497 0 0

LONDON.—For the enlargement and alteration of the Kennington Fire Brigade Station, for the London County Council:—
Stimpson & Co. ..... £11,899 | Scharien & Co. £11,875

LONDON.—For the provision of a permanent school on the site in Bailey's-lane, South Tottenham, to provide accommodation for 393 children, and for a house for the schoolkeeper with a room for manual training purposes underneath, and a hall, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add
W. Gregar & Son	£10,800 0 0	£167
Foster & Dicksee	10,800 0 0	158
S. & W. Pattinson	10,522 0 0	166
C. Miskin	10,217 18 3	209
Stimpson & Co.	10,050 0 0	200
E. Lawrance & Sons	9,956 0 0	188
Killby & Gayford	9,957 0 0	167
W. M. Dabbs	9,891 6 0	207
C. Cox	9,808 0 0	188
W. Shurmur	9,802 0 0	188
Treasure & Son, Harringay, N.*	9,588 0 0	190

* Recommended for acceptance by the Works Committee.

LONDON.—For alterations and repairs to the "Old Farm House," public-house, Kentish Town-road, for Mr. Green. Mr. Albert E. Pridmore, architect and surveyor, Broad-street Buildings, E.C.:—

C. Collins	£412 0	Emmans & Co.	£349 0
Randall	408 0	King & Co.	330 18
E. W. Gray	385 0	Wiltshire & Co.	288 0
Gould & Brand	380 0	Davenport & Co.	269 0
Ellis & Dodd	359 7	London & Co.	269 0

LONDON.—For providing new cloak-rooms for the infants' department to the Winstanley-road School, Battersea, for the School Board for London:—

Lathey Bros.	£223 0	R. E. Williams & Sons	£140 0
Rice & Son	159 0	W. Hammond, 72, York-road, Battersea*	113 0
J. Garrett & Son	150 0		
G. Wood & Co.	146 10		

* Recommended for acceptance by the Works Committee.

LONDON.—For erecting a laundry-centre and a manual training-centre in connexion with the Duncombe-road School, Upper Holloway, and for providing a covered playground for girls and infants, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add
J. Grover & Son	£1,910	£48
McCormick & Son	1,825	49
J. Willmott & Sons	1,795	74
E. Houghton & Son, 74, Lancaster-road, Stroud Green, N.*	1,621	75

* Recommended for acceptance by the Works Committee.

LONDON.—For providing rooms in connexion with the Montem street School, Tollington Park, and for erecting a laundry-centre for the School Board for London. Mr. T. J. Bailey, architect:—

		For brickwork in cement add
J. Willmott & Son	£6,429	£98 0
R. Yorbury & Sons	5,745	82 10
C. Cox	5,600	75 0
E. Lawrance & Sons..	5,506	75 0
E. Houghton & Son, Stroud Green* ..	5,218	66 0

* Recommended by the Works Committee for acceptance.

LONDON.—For the provision of a manual training centre in connexion with the Gifford-street School, Islington, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement add
J. Willmott & Son	£1,630	£36
J. Grover & Son	1,552	24
W. Gregar & Son	1,549	24
McCormick & Sons	1,537	23
Staines & Son	1,461	21
E. Lawrance & Sons	1,364	28
J. Harvey, 57, Red Cross-street, E.C.*	1,335	17

* Recommended by the Works Committee for acceptance.

LONDON.—For the provision and erection of three temporary iron buildings on the sites in Dragmire-lane, Balham, the "Grove," Earlsfield, and Smallwood-road, Garratt-lane, for the School Board for London. Mr. T. J. Bailey, Architect:—

Dragmire-lane, Balham.

J. Lysaght, Ltd.	£1,676 0	W. Harbrow	£1,395 0
I. Dixon & Co.	1,657 10	Humphreys, Ltd.	1,350 0
T. Cruwys	1,500 0	E. C. & J. Keay, Ltd.*	1,279 15
D. Charteris	1,475 0	F. Morton & Co., Ld.	1,224 0
Croggon & Co., Ltd.	1,465 0		

"The Grove," Earlsfield.

J. Lysaght, Ltd.	£1,610 0 0	W. Harbrow	£1,345 0 0
I. Dixon & Co.	1,571 4 6	F. Morton & Co., Ltd.	1,308 0 0
T. Cruwys	1,450 0 0	E. C. & J. Keay, Ltd.	1,205 0 0
Croggon & Co., Ltd.	1,420 0 0	Humphreys, Ltd.*	1,200 0 0
D. Charteris	1,385 0 0		

Smallwood-road, Garratt-lane.

J. Lysaght, Ltd.	£1,648 0	W. Harbrow	£1,378 10
I. Dixon & Co.	1,616 5	Humphreys, Ltd.	1,326 0
T. Cruwys	1,600 0	F. Morton & Co., Ltd.	1,276 5
Croggon & Co., Ltd.	1,440 0	E. C. & J. Keay, Ltd.*	1,230 0
D. Charteris	1,432 0		

* Recommended for acceptance by the Works Committee.

LONDON.—For alterations and improvements to the Central-street School, St. Luke's, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add
McCormick & Sons	£4,100	£17
Staines & Son	4,011	30
W. Gregar & Son	3,988	50
Charles Cox	3,773	19
Hearle & Farrow	3,752	36
G. S. S. Williams & Son	3,687	32
Vernall, Danes, & Co.	3,617	24
E. Lawrance & Sons	3,568	37
J. Grover & Son	3,557	27
F. G. Minter, Johnson-street, Westminster*	3,312	50

* Recommended by the Works Committee for acceptance.

LONDON.—For the provision of a laundry-centre in connexion with the Southampton-street School, Camberwell, and for other works, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add
Holloway, Bros.	£1,614	£33 0
W. Downs	1,599	30 0
Holliday & Greenwood	1,533	82 0
J. Marsland	1,467	44 0
E. Triggs	1,440	56 10
J. Garrett & Son, 40, Old Town, Clapham*	1,339	44 0

* Recommended for acceptance by the Works Committee.

LONDON.—For the provision of a laundry centre in connexion with the Vicarage-road School, Plumstead, and for other work, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add
Holliday & Greenwood	£1,496 0 0	£48 0 0
Mid-Kent Building and Contracting Works, Ltd.	1,344 12 6	44 6 6
T. H. Craig	1,315 16 0	34 8 6
T. White & Son	1,304 17 11	44 9 2
M. Calnan & Co.	1,310 0 0	25 0 0
E. Proctor	1,260 8 0	32 12 0
Kirk & Randall	1,244 0 0	43 0 0
W. Akers & Co.	1,225 10 0	58 10 0
J. Otway, Chislehurst*	1,197 0 0	30 0 0

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting a cookery centre in connexion with the Priory-grove School, Wandsworth-road, and for other work, for the School Board for London. Mr. T. J. Bailey, architect:—

		For brickwork in cement, add
Rice & Son	£1,888 0 0	£40 0 0
G. Newton	1,752 5 0	34 9 0
E. Triggs	1,571 10 0	54 0 0
W. Akers & Co.	1,558 8 4	61 10 9
J. Garrett & Son	1,531 0 0	37 0 0
J. Marsland	1,492 0 0	42 0 0
W. Downs, Hampton-street, Walworth-road, S.E.*	1,499 0 0	35 0 0

* Recommended for acceptance by the Works Committee.

LUTON—For the erection of two lodges, &c., upon the recreation grounds in Dallow-lane and Park-street, Luton, for the Town Council. Mr. T. Ridyard Roscoe, Architect and Borough Surveyor, Town-hall, Luton:—

	Each.		Each.
W. G. Dunham	£498 10	G. W. Pryor	£447 0
Jno. Saunders	495 0	[All of Luton.]	

NORTHWICH.—For the erection of banking premises, for the Manchester and County Bank. Mr. M. K. Ellerton, architect, 26, High-street, Northwich:—

Steitox & Carter	£4,050	Taylor & Son	£3,801
Molyneux	4,040	Beckett, Northwich*	3,777
A. Bostock	3,975	Ravenscroft	3,720
Leicester	3,925	Rylance	3,571
E. W. Bostock	3,875	Appleton	3,550

* Accepted.

PENGE.—For new warehouses, for Messrs. Payne & Birdseye, Penge:—

Uland & Nicol	£1,435	Smith	£860
Smith & Sons	947	Henry Leney (accepted)	770
Jones	867		

PLYMOUTH.—For additions to the Household of Faith School, Vennel-street, for the Trustees. Mr. Thos. Newton Andrews, architect, 4, Gordon-terrace, Plymouth:—

W. Repath	£238 17 6	Roach & Lovell	£149 15 0
W. T. Egford	223 0 0	J. H. Blackell	142 15 0
E. Perraton	188 0 0	Pellow & Co	129 10 0
Westlake & Waldron	184 0 0	T. A. Pearn & Son, 3, Bernard-place, Plymouth (accepted)	124 0 0
W. G. Goad	170 0 0		
E. Porter	157 0 0		

PLYMOUTH.—For alterations and additions to No. 187, Union-street, Plymouth. Mr. James Harvey, architect, 9, Courtenay-street, Plymouth. Quantities by architect:—

Trevena	£512 0	Lethbridge	£431 15
Matcham & Co.	496 0	Pearn & Sons	389 0
Smith & Sons	469 15	Palmer	385 0
Good & Co.	467 0	Coles	365 0
Julian	458 0	Blake*	357 0

* Accepted.

PLYMOUTH.—For re-covering in of roof of the old Tabernacle, Exeter-street, Plymouth. Mr. James Harvey, architect, 9, Courtenay-street, Plymouth:—

Pearn & Sons	£138 0 0	Blackell & Shepperd	£128 0 0
Harvey	133 16 0	Blake*	126 0 0

*Accepted.

PUDSEY (Yorks.).—Accepted for the supply of 1,660 yards cast-iron water-pipes, Waterloo-road, for the Urban District Council:—

	Per Ton. s. d.
E. & W. H. Haley, Lister Hills Foundry, Bradford	4 5

SOUTHEND-ON-SEA.—For the erection of school buildings, Leigh-road, for the School Board. Mr. W. Y. Hobbiss, architect, Clarence-road, Southend. Quantities by Mr. F. W. Harrison:—

Baker & Wiseman	£8,250 0	Woodhams	£6,788 0
J. W. Steward	7,916 16	F. Smith, 36, Park-street, Southend*	6,684 0
Darke & Son	7,327 0		

* Accepted provisionally.
[Architect's estimate, £7,280.]

WATFORD.—For new police barracks, Watford. Mr. Urban A. Smith, County Surveyor, 41, Parliament-street, S.W.:—

Yerbury & Sons	£2,190	J. Payne	£1,780
W. Lissaman, jr.	1,930	Wm. Judge	1,750
Andrews & Sons	1,875	H. Flint	1,749
C. Brightman	1,846	Wilkinsen Bros.	1,725
G. Wiggs	1,829	G. & J. Waterman	1,692
Chas. Eames	1,825	F. Dupont	1,690
Thos. Turner, Ltd.	1,800	Jas. Darell	1,686
F. H. Halliday	1,793	Clifford & Gough, Watford*	1,660
Hy. Martin	1,780	Collins & Basbes	1,650

* Accepted.

WARRINGTON.—For forming and paving Friar's Green, &c., for the Corporation. Mr. Thos. Longdin, Borough Surveyor, Warrington:—

F. T. Bennie	£593	3	5	Thos. Stringer	£297 19 4
J. Ewart	354	0	0	Thos. Flood	190 8 0
Wm. Heaton	338	0	0		

[All of Warrington.]

WEST DERBY (Lancs.).—For sewering, &c., Sandstone-road, Highfield-road, and others, for the Urban District Council. Mr. F. C. Everett, Surveyor, Public Offices, Green-lane, Tuebrook, Liverpool:—

T. Alexander	£6,712 7 7	J. McCabe	£6,076 16 4
W. F. Chadwick	6,291 1 10	L. Mason & Son	5,864 18 8
James Keating & Sons	6,215 1 9	James Wilde, Wavertree, Liverpool*	5,396 0 0

[Surveyor's stimate £5,849 1s. 6d.]

* Accepted.

WOOLER.—Accepted for erection of Primitive Methodist Chapel, Wooler, Northumberland. Mr. George Reavell, jun., architect. Quantities by the architect:—

Masonry.—Robert Hogarth, Wooler	£248 12 6
Joinery.—Walter Allen, Wooler	203 13 0
Slating.—Thomas Smart, Wooler	49 0 0
Plumbing.—Wilkin & Dickman, Alnwick	37 0 0
Plastering.—Thomas Smart, Wooler	25 16 6
Painting.—John Percy, Alnwick	33 5 0
Heating.—John N. Reavell, Alnwick	31 17 6
Total	£629 4 6

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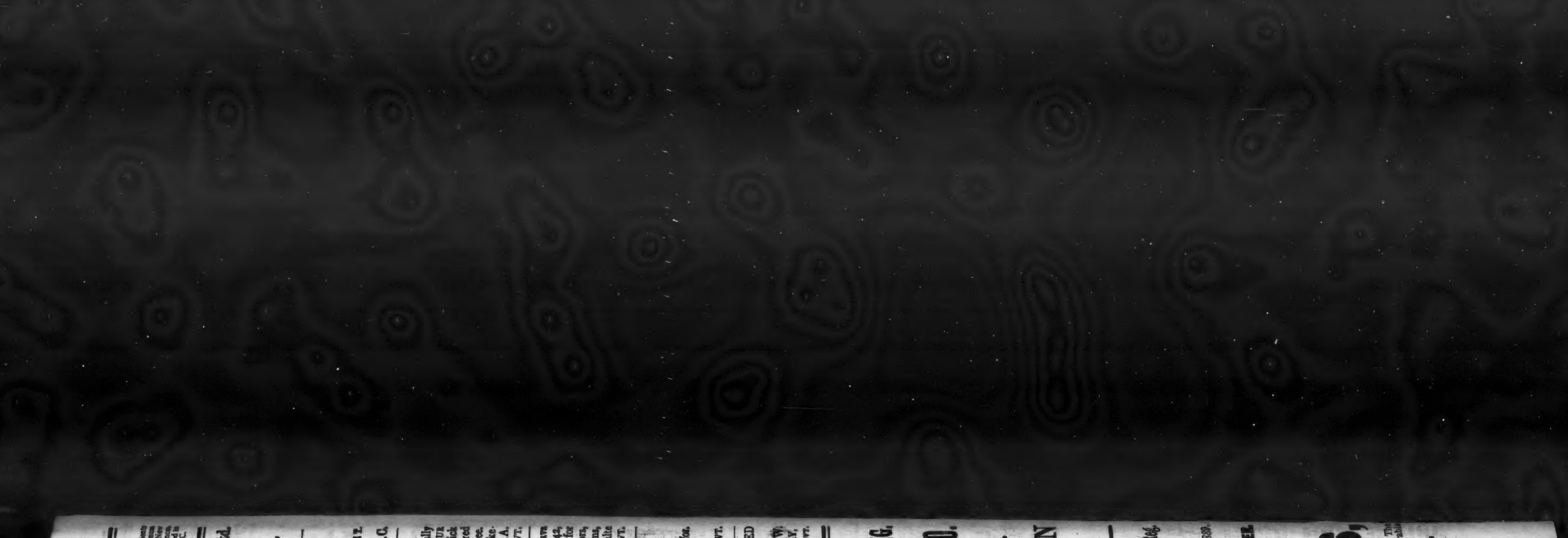
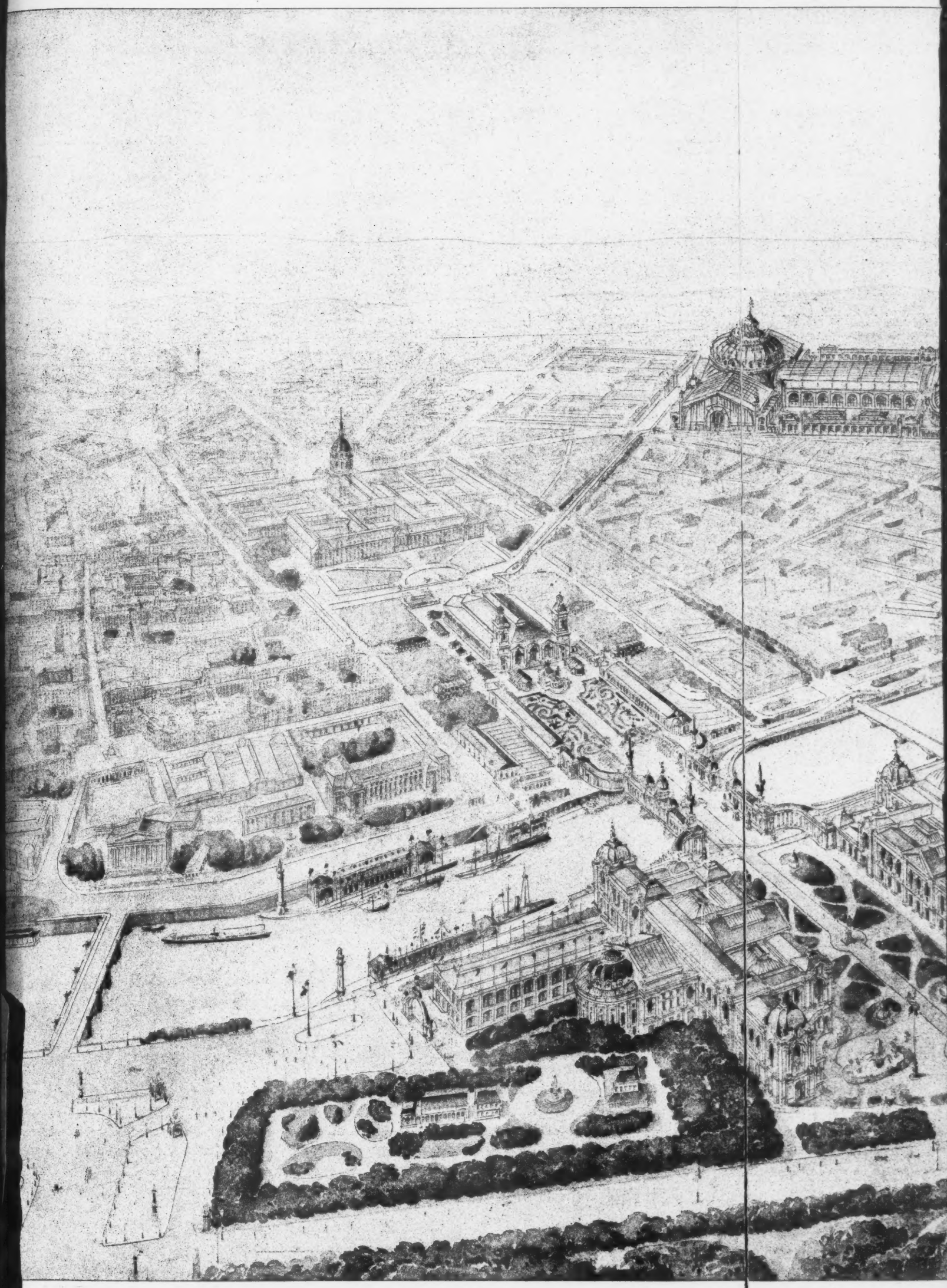
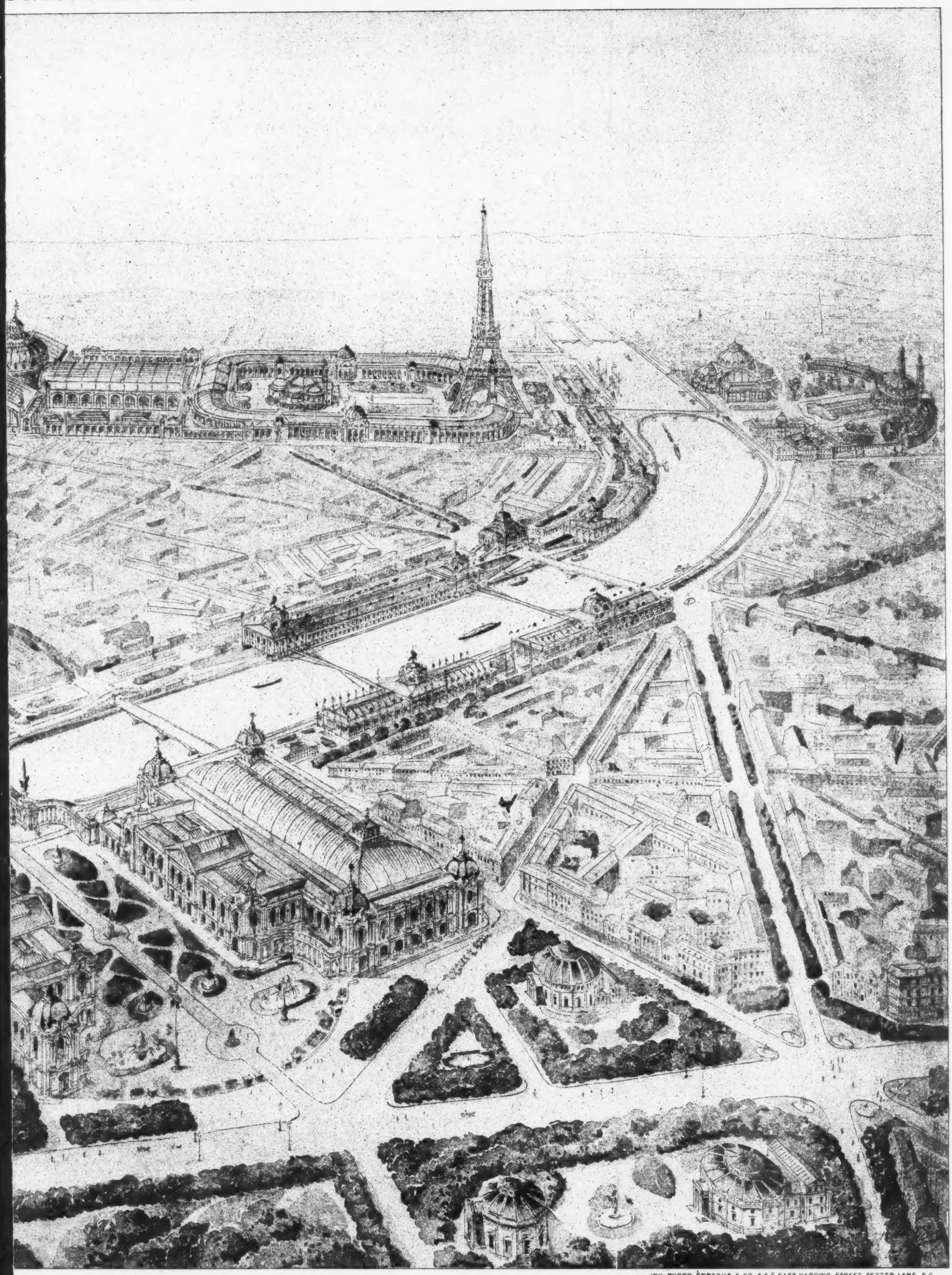
PETERS, BARTSCH, & CO., DERBY. London Office, 68, QUEEN STREET, CHEAPSIDE, E.C.





SCHEME FOR THE PARIS EXHIBITION OF 1900.—B

ONE OF THE THREE FIRST PREMIATED



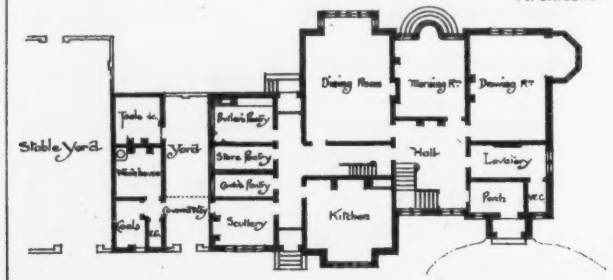
INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

RIS EXHIBITION OF 1900.—By M. Hénard, Architect.

HE THREE FIRST PREMIATED DESIGNS.

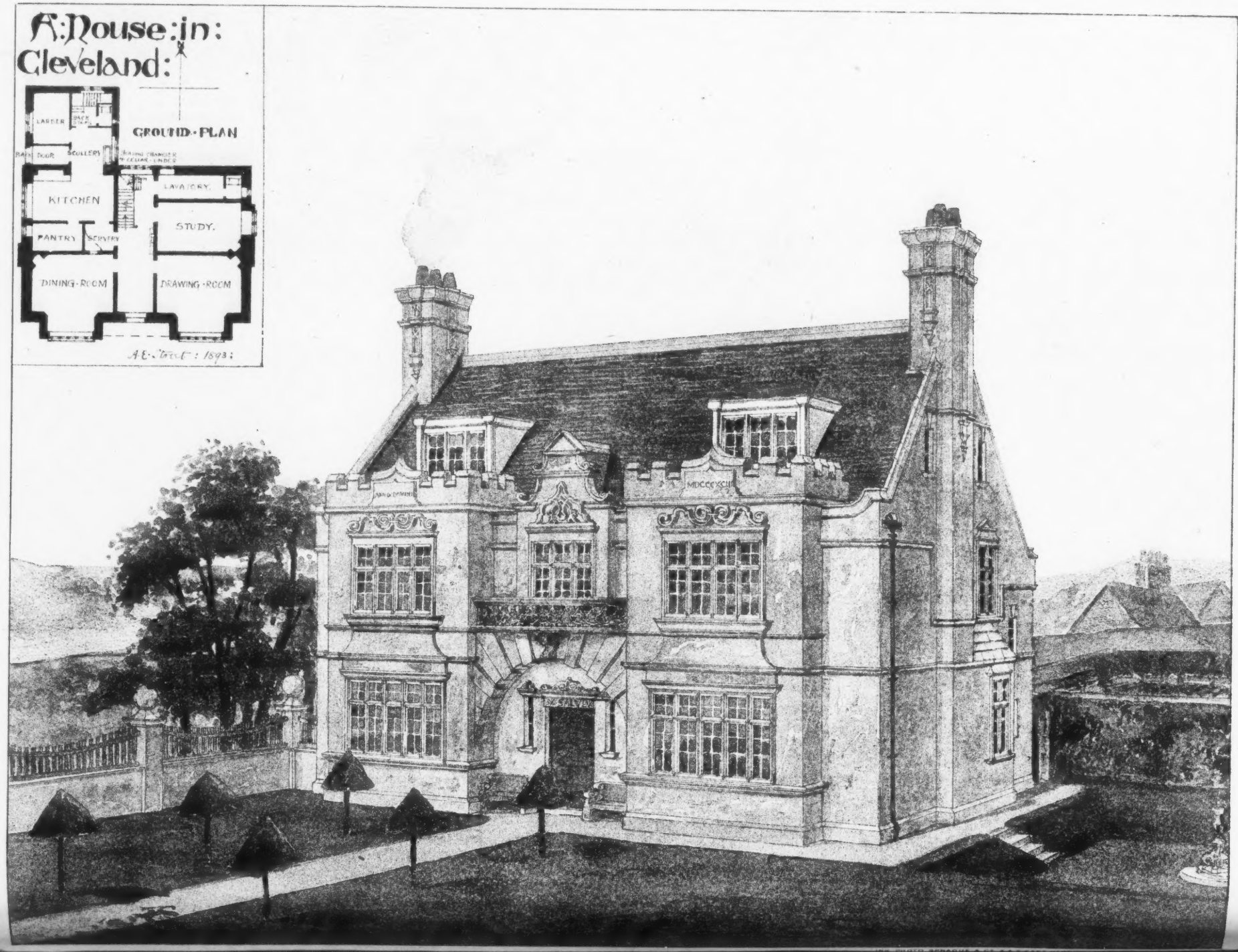
HOUSE · DISLEY · CHESHIRE

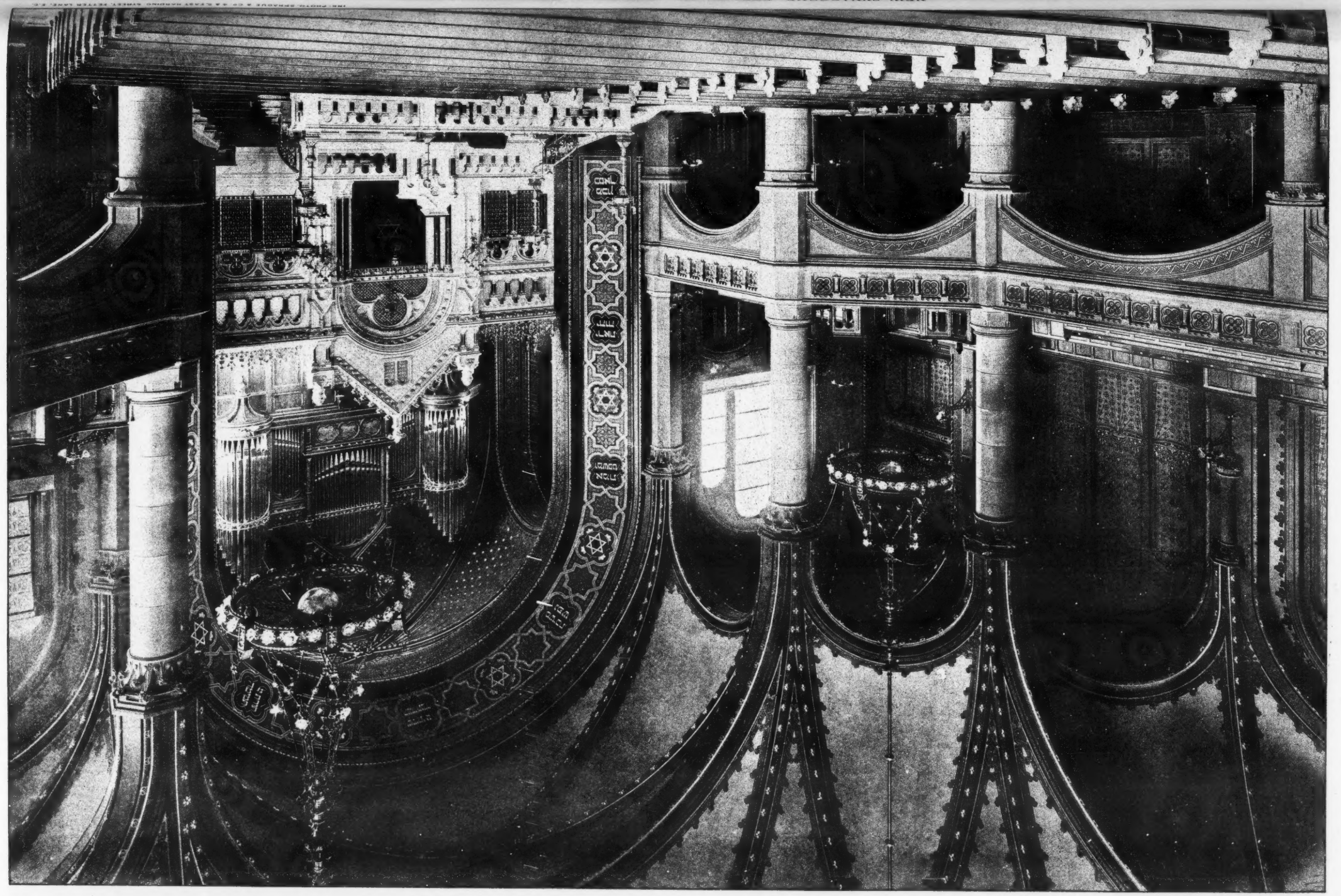
FOR A. CREWDSON. Esq. · Mr John Brooke A.R.I.B.A. Architect.

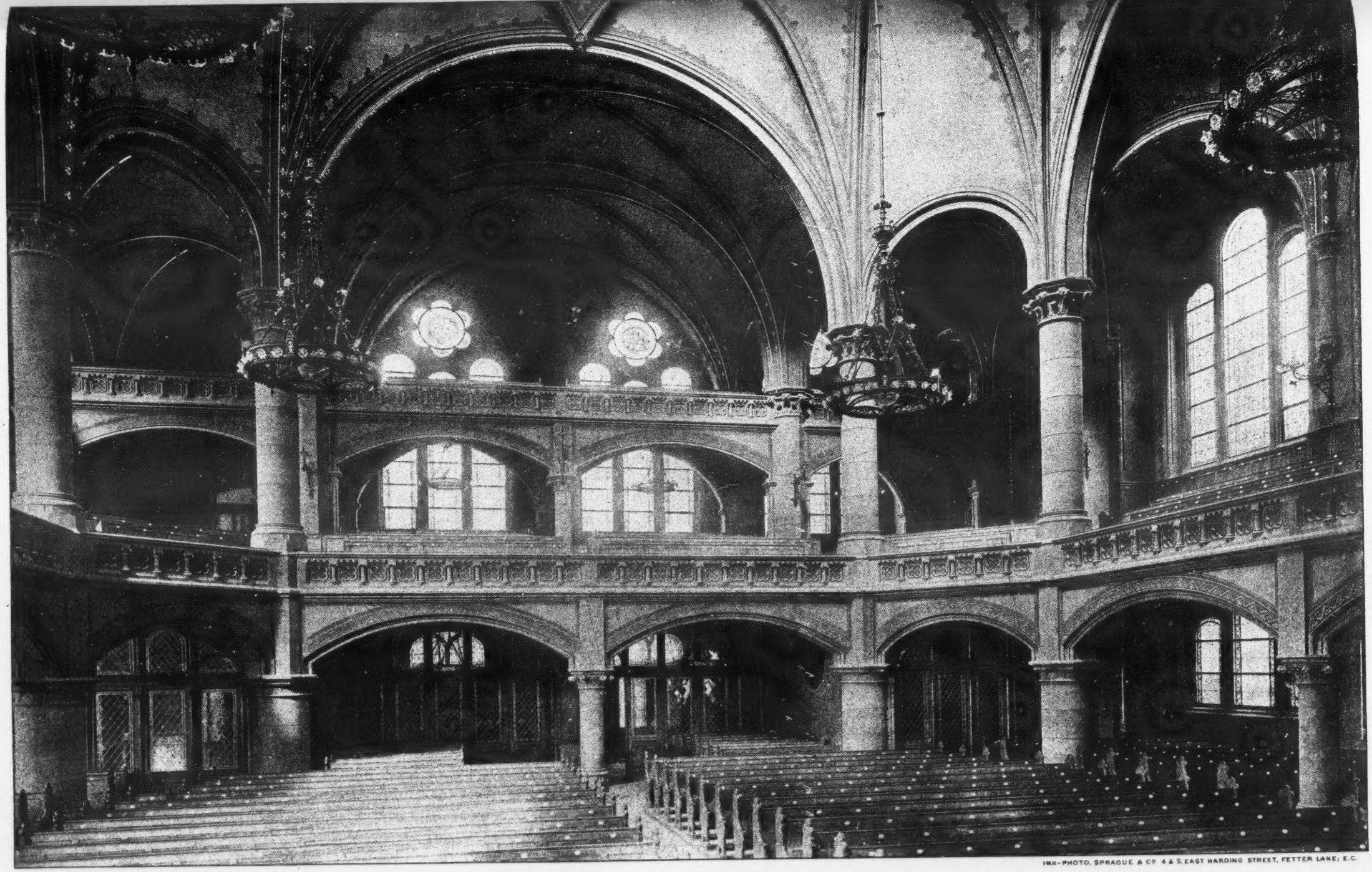


John Brooke Arch.
Manchester

A House in Cleveland.



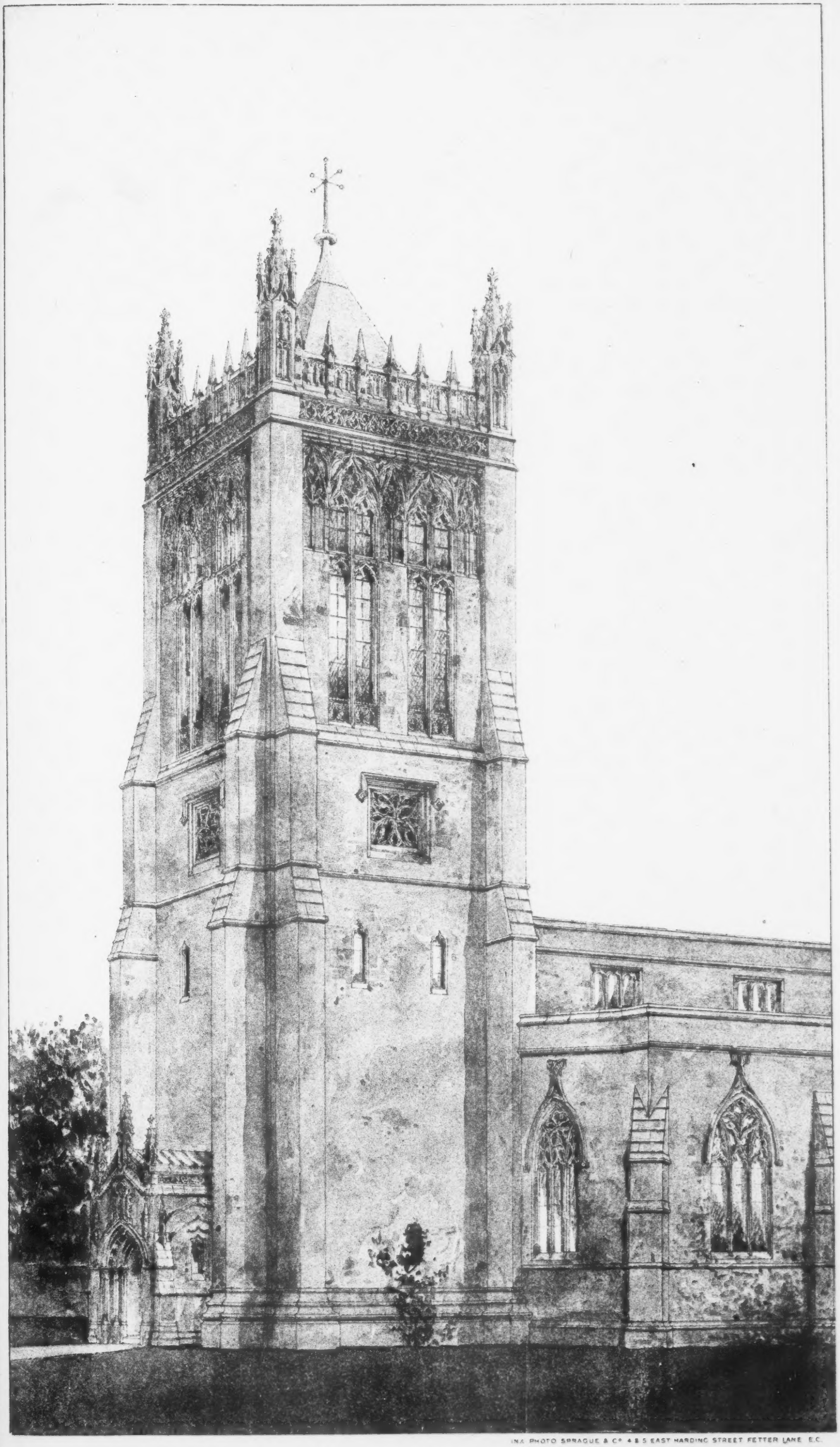




INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

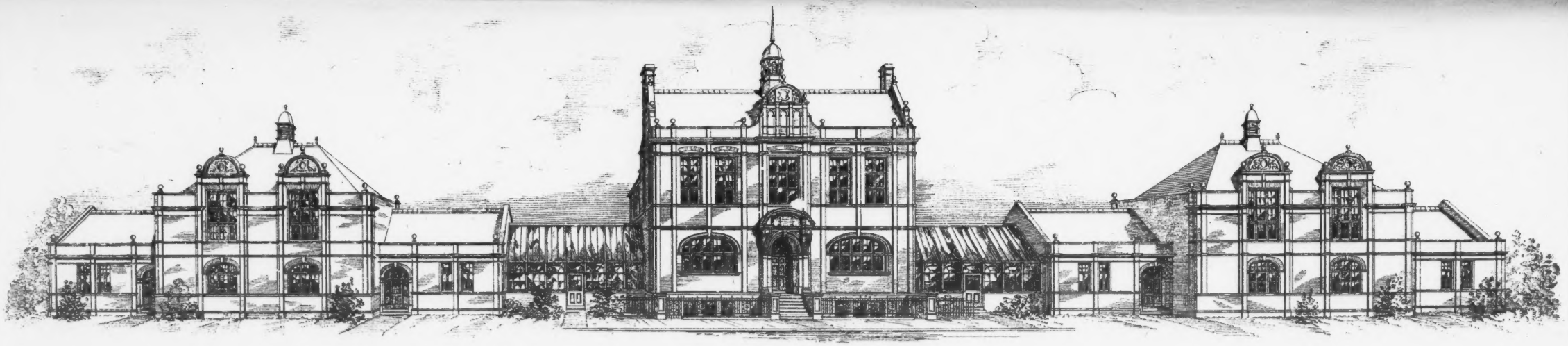
NEW SYNAGOGUE, BERLIN.—Messrs. Cremer & Wolffenstein, Architects.

PRO



INA PHOTO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E.C.

PROPOSED NEW TOWER AND AISLES, DEWSBURY CHURCH, YORKSHIRE.—Mr. Arthur E. Street, F.R.I.B.A., Architect.



KINDERGARTEN TRAINING COLLEGE KINDERGARTEN

THE FROEBEL EDUCATIONAL INSTITUTE
COLET GARDENS . WEST KENSINGTON

JOHN S QUILTER. F R I B A. ARCHT

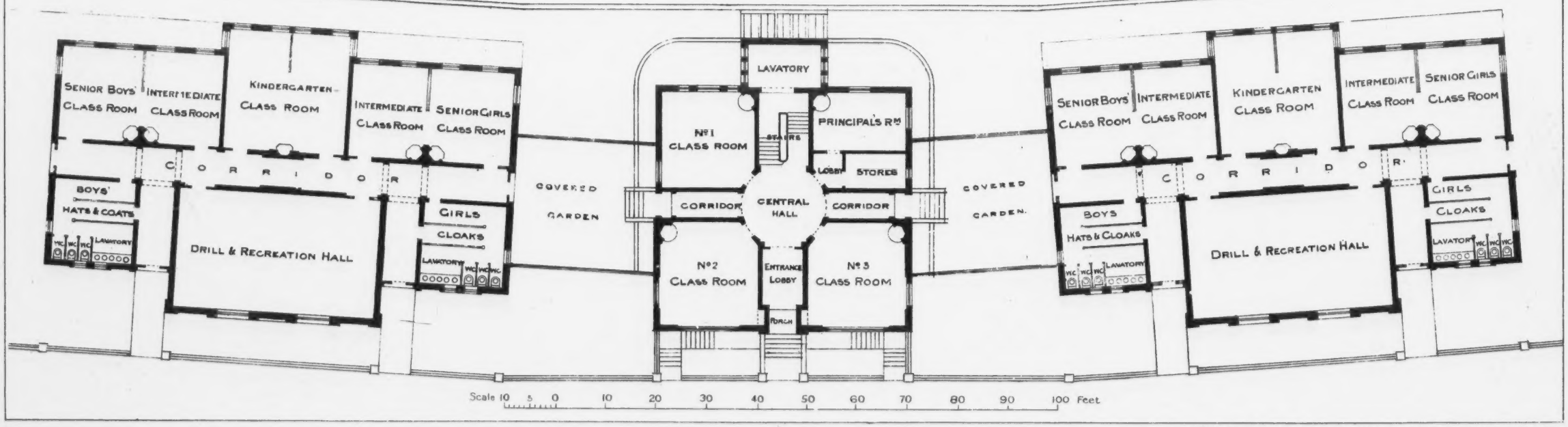


PHOTO-LITHO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E C